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No. 6.—DISEASES OF THE STOMACH OF THE ADULT RUMINANT*

BY

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STRATHAVEN

This was the first of the two papers discussed on the morning of the final day of Congress, and there was a good attendance at the Technical College, under the chairmanship of Mr. R. W. Hall, M.R.C.V.S., of Barry, who promptly invited Mr. Hugh Begg to introduce his paper on "Diseases of the Stomach of the Adult Ruminant."

The CHAIRMAN: The diagnosis of the diseases of the adult ruminant has always been to me an intriguing and not infrequently baffling problem. Mr. Hugh Begg's paper has in great measure cleared some of the diagnostic pictures. I am sure the paper should lead to a very profitable discussion, and I will now call on Mr. Begg.

Mr. HUGH BEGG: In presenting this paper I do so conscious of the great honour accorded me by the Provisional Committee, but conscious also that many of the opinions expressed will not meet with the full approval of everyone here. Although the paper is based on experience, I do not necessarily claim originality for many of the features described.

I would like to amplify it in only one small respect. That is, that I do not wish my reference to blood examination as a diagnostic aid to seem a reference only. I find the interpretation of the differential leucocyte count to be of considerable practical value and would be interested to know the experiences of other practitioners regarding it.

I am looking forward with great interest to what Mr. Morgan and Mr. Davies have to say, and I hope that in the ensuing discussion many points in this controversial subject, which is of such great importance to us, will be cleared up.

Following is the text of Mr. Begg's paper:—

* Presented to the 68th Annual Meeting of the National Veterinary Medical Association, at Cardiff, on September 8th, 1950.

Diseases of the Stomach of the Adult Ruminant

The differential diagnosis of disturbances of digestion in the cow presents a problem requiring the application of considerable skill and patience. Although diminished appetite and cessation of rumination appear to be common to most illnesses, gastric dysfunction is without doubt more often secondary than primary, and one has to guard against attributing obscure or undiagnosable illness to derangement of the digestive system.

Excepting, therefore, the urgent or obvious case, a consideration of the digestive syndrome shown by the sick animal should always be preceded by a thorough general examination; only after eliminating all remote pathological conditions which may depress appetite and rumination can one assume the necessity for a review of the digestive symptoms shown, and for a detailed inspection of the stomachs. A sceptical approach to stomach trouble yields the most satisfactory results.

In this paper, based largely on clinical observation and experience, and confined to the adult, I propose firstly to deal with the history and signs and symptoms which may lead one to suspect "indigestion"; secondly, to comment on certain specific conditions, and lastly to query the necessity for or advisability of the exhibition of purgatives, tonics, etc., in the treatment of stomach trouble in the cow.

THE HISTORY AND SYMPTOMS OF GASTRIC DERANGEMENT

Because of our unfortunate inability to perform other than a superficial inspection, palpation, percussion and auscultation of the gastric compartments and because of the paucity of pathognomonic symptoms, the information obtained from the owner or attendant often will prove to be of as much, if not more, value than that given by examination alone.

One should therefore endeavour to obtain intelligent responses to a few of the following types of question:—

(*a*) Did the animal stop eating suddenly or gradually?

A sudden loss of appetite suggests acute illness, *e.g.*, traumatic reticulitis; a gradual loss indicates a condition of insidious onset, *e.g.*, acetonaemia.

(*b*) Is the patient eating certain foods and refusing others?

Teeth and mouth trouble apart, the consumption of hay or other fodder with the refusal of concentrates or roots points immediately to acetonaemia.

(*c*) Is the animal chewing the cud?

Persistence of normal rumination is characteristic of acetonaemia; early traumatic peritonitis causes a complete cessation.

(*d*) Has the passage of faeces been normal?

Temporary complete cessation of bowel movement is characteristic of the early stages of traumatic gastritis and of some forms of abomasitis.

(*e*) If the patient is a cow in milk, how long is it since she calved?

The illness of the recently calved cow may be difficult to diagnose, metabolic disorders and those septic conditions associated particularly with cows at this stage presenting many features causing confusion with pathological conditions originating in the stomachs. This is particularly the case with acute peritonitis; a uterine or traumatic origin may defy differentiation except by exploratory operation.

Parturition, too, seems to favour the recrudescence of a previous partly healed and unsuspected chronic peritonitis of traumatic origin.

Having obtained a clear picture of the case history, examination may be proceeded with, bearing in mind that the limitations of examination make all the more important a correct interpretation of the symptoms shown. The following symptoms are found to be associated with gastric disturbances:—

Acute tympany of the rumen

Acute tympany of the rumen implies a condition in which gas is continually being formed, with little or no relief by eructation, the animal being in some danger of collapse and death. This condition arises only in frothy bloat and in complete oesophageal obstruction. Ruminal motility is depressed only mechanically.

Subacute tympany of the rumen

Tympany of the rumen is subacute when the degree of tympany is kept static by eructation, when intraruminal gas pressure is sufficient to overcome the obstacle. It may be due to either:—

(*a*) Any condition which produces oesophageal obstruction of a limited degree, rumen motor activity being normal. Such conditions as partial choke, oesophageal stenosis, and pressure on the latter organ produce this type of tympany.

Or (*b*) any condition which produces complete ruminal atony (oesophageal conditions being normal). This form is generally less marked, and is noted chiefly (but not always) in the first stages of traumatic peritonitis, in early peritonitis of other origin, and sometimes in abomasal or intestinal obstruction.

Chronic tympany

Chronic tympany is a persisting or recurrent subacute tympany and is found usually in association with oesophageal interference.

Peritoneal tympany

Peritoneal tympany implies the presence of gas within the abdominal cavity. I have met this condition only when rumen gas has escaped from a trocar or knife wound to relieve ruminal tympany, a tympany of both flanks being produced. Other observers have noted an effluvium of gas from the peritoneal cavity during performance of rumenotomy for the relief of traumatic gastritis. The condition undoubtedly exists, but evidently not so commonly as was believed by earlier authors (Arnold, Imrie[1, 2]), who described a subacute ruminal tympany, interpreted it as "peritoneal tympany," and gave it as a pathognomonic symptom of traumatic gastritis.

Atony of the rumen

Atony of the rumen implies a condition in which there is cessation or decrease in frequency of rumen contractions. The presence or absence of atony is best discovered by auscultation and its existence implies a similar state of affairs in the reticulum. This symptom should always be interpreted with a great deal of caution since in my opinion ruminal atony is generally a secondary condition and rarely due to conditions within the stomachs. Complete atony may arise following acute febrile conditions, septic conditions and toxaemias, and it may be a complication of clinical or sub-clinical hypocalcaemia. As a symptom of gastric derangement atony is found only in the following circumstances:—

(*a*) In the earliest stage of traumatism.

(*b*) In the presence within the rumen of abnormal material, *e.g.*, foetal membranes.

(*c*) In the absence of roughage from the diet.

In all other cases of illness in which ruminal atony is a prominent symptom, the seat of primary trouble is elsewhere. The author is unfamiliar with the atonic tympany said to be of allergic origin and responding to antihistaminics.

Impaction of the rumen

Examination of the rumen by deep palpation in the flank or by palpation per rectum very often conveys an impression of "impaction" in that the mass is solid and unyielding. In cattle on winter feeding this "impaction" is consistent with health. If ruminal atony has been present for some time before examination an impression of "impaction" arises through levitation of the coarser rumen contents, the lower parts of the rumen containing excessively fluid material.

True impaction, in my opinion, occurs only through over-eating; the rumen is visibly distended and there may be present a variable degree of tympany and evidence of abdominal discomfort.

Vomiting

Cattle, unfortunately, rarely vomit, the reason apparently being that the vomiting centre is poorly developed. It does occur, however, in the following circumstances:—

(*a*) In occasional cases of acute frothy bloat.

(*b*) In occasional cases of traumatic reticulitis.

(*c*) After the consumption of certain toxic materials, notably rhododendron and laurel.

(*d*) In some cases of actinobacillosis of the rumen or reticulum.

(*e*) In some cases of abomasal ulceration.

Cud-dropping

Dropping of the cud is a more unusual condition which must not be confused wth the foregoing. The cause of rejection of a cud is generally unknown, but there have been instances of finding a metallic foreign body within a rejected bolus.

The return of a bolus of food due to oesophageal stenosis or diverticulum is readily differentiated from either vomiting or cud-dropping, an examination of the materal showing there to be no admixture with or similarity to ruminal contents.

Retching

The animal which vomits may or may not retch during the act. On the other hand, certain observed cases have been noted to give rise to a series of prolonged gurgling retching sounds of an alarming intensity immediately before obtaining the first cud of a ruminating period. (A similar sound of lesser degree may be produced by inserting a finger into the cardiac sphincter during exploration of the rumen.)

Experience has shown this symptom to be pathognomonic of actinobacillary disease of the cardiac region of the rumen.

Grunting

Grunting or groaning is a frequent symptom of a wide variety of pathological conditions and indicates either pain or respiratory embarrassment. Since an expiratory grunt is produced by a temporary voluntary fixation of the diaphragm it is readily seen that painful conditions of either

the thorax or the abdomen may give rise to this symptom. The duration and intensity of the grunt vary greatly and seem to bear a relation to the severity of pain or degree of respiratory distress.

Of the numerous morbid conditions of the chest which may show grunting as a symptom the most notable are:—

(*a*) Pulmonary emphysema.
(*b*) Aspiration pneumonia.
(*c*) Pleurisy.

Grunting in chest conditions is usually associated with respiratory abnormality. It is continuous, usually loud, and in severe cases mouth breathing is usual.

Of the painful abdominal conditions which cause grunting the most important are:—

(*a*) Peritonitis from any cause.
(*b*) Acute enteritis or gastro-enteritis.
(*c*) Acute closed metritis with a uterus greatly distended with fluid.

Actinobacillosis of the Rumen and Reticulum

While actinobacillosis of the digestive tract is readily recognised when the disease is present in the region of the mouth, more difficulty is experienced in diagnosing the condition when its seat is in the fore-stomachs. That the disease is not infrequent in these situations was confirmed by Russell Greig[3], who found lesions of actinobacillosis in the rumen and reticulum in 25 per cent. of 60 selected cases. Although abattoir experience of the disease is common, Arthur[4] states that actinobacillosis of the rumen and reticulum is unlikely to produce recognisable symptoms.

In the author's experience actinobacillosis of the rumen and recticulum is an occasional cause of obscure unthriftiness and may produce certain positive signs of gastric derangement. A recapitulation of 25 cases observed in the past two years has shown that actinobacillosis of the fore-stomachs may reasonably be suspected in an unthrifty animal, firstly by a negation of all other common conditions, and, secondly, by a correct interpretation of one or more of the following positive symptoms shown:—

(*a*) Chronic or intermittent subacute tympany of the rumen.
(*b*) Persistent vomiting.
(*c*) Enlargement of the rumen (and consequently of the abdomen).
(*d*) Retching before rumination.
(*e*) Pica.

Exploratory rumenotomy will, of course, remove all doubts. Affected areas of the rumen become smooth to the touch and greatly thickened and indurated, while the disease in the reticulum results in partial disappearance or occlusion of the cellular structure. The appended table shows a summary of the cases encountered. It is to be noted that response to specific therapy is held to verify diagnosis.

The following remarks on individual cases may be of interest.

No. 9 (C.N.). This cow, said to be due to calve, was in a very poor condition. Pulse rate and temperature were normal. The abdomen was greatly enlarged and first glance gave the impression of a cow with hydrops amnii. Rectal examination, however, showed a non-gravid uterus and the rumen to extend well over into the right side of

Summary of 25 Cases of Actinobacillosis of Fore Stomachs

Case No.	Sex	Age, years	Symptoms					Verification of diagnosis	Remarks
			Subacute ruminal tympany	Vomition	Retching	Pica	Enlarged rumen		
1	F.	6	C			+		Rumenotomy	No response to treatment. P.M.: oesophagus affected
2	F.	4	C			+		P.M.	No response to treatment. P.M.: rumen and reticulum affected
3	F.	1½	C				+	Rumenotomy	Cure K.I. (see below)
4	F.	3	C					Response K.I.	
5	F.	1½	C					Rumenotomy	Cure K.I. (rumen).
6	F.	7	C	+	+			"	" (") (see below)
7	F.	6		+	+			Response K.I.	
8	F.	5	I		+			P.M.	Previous history "wooden tongue." Uneconomical to treat (rumen and reticulum)
9	F.	6					+	"	(See below)
10	F.	6			+			Response K.I.	
11	F.	8	C	+			+	Rumenotomy	Cure K.I. (rumen)
12	F.	4	C					"	" (")
13	F.	7	I					Response K.I.	
14	F.	4	I					"	
15	F.	4	C	+				"	
16	F.	4	C					"	
17	F.	5	C					Rumenotomy (rumen)	Partial cure only K.I. No P.M.
18	F.	7					+	Response K.I.	
19	F.	6	C					"	
20	F.	4	I				+	"	Previous history chronic diarrhoea, not Johne's disease
21	F.	5	C					P.M.	Uneconomical to treat (rumen and reticulum)*
22	F.	1	C					Rumenotomy	Poor response K.I. (rumen affected but no P.M.)
23	F.	5	C		+			Response K.I.	
24	F.	5	I					P.M.	(See below)
25	F.	5	I					Response K.I.	

C = continuous. I = intermittent. * Abattoir report.

the abdomen. A diagnosis of suspected actinobacillary involvement of the stomachs was given and the case considered uneconomical to treat. *Post-mortem* examination showed the disease to be confined to the reticulum, the wall of which was 3½ inches thick and the honeycomb structure almost totally destroyed.

No. 6 (S.D.). When first seen this case showed continuous tympany and repeated vomiting and retching. A diagnosis of actinobacillosis was made and therapy with potassium iodide commenced. After ten days' treatment there was no improvement and exploratory operation merely confirmed the original diagnosis, the disease being present in the region of the oesophageal groove and cardia. The treatment was pushed, and although the vomiting persisted for three weeks, ultimately a complete cure was obtained.

No. 3 (P.M.). In this case an enlarged abdomen and unthriftiness had been noted for three months before tympany appeared. The tympany was continuous and moderately severe. Exploratory rumenotomy showed extensive involvement of the rumen with actinobacillosis. Treatment with potassium iodide was given for six weeks before improvement commenced, but an ultimate complete cure resulted.

No. 24 (N.N.). This cow presented symptoms of tympany of a type suggestive of actinobacillosis. Iodide treatment was commenced, but one week later there had developed a very marked abdominal respiration with symptoms of pulmonary emphysema. Emaciation had been rapid and slaughter was advised. *Post-mortem* examination disclosed actinobacillosis involving the rumen and reticulum and extensive lesions in the substance and on both serous surfaces of the diaphragm.

Discussion

Of 25 cases observed, 21 showed a continuous or intermittent subacute tympany of the rumen, four showed vomiting, five retching, five enlargement of the rumen and two pica. A tentative diagnosis of actinobacillosis was confirmed in eight cases by exploratory rumenotomy, in five cases at *post-mortem* examination, and a further 12 suspected cases showed improvement and disappearance of symptoms after specific treatment with iodides.

All the cases noted were within attested herds, and the similarity of the type of tympany shown to that caused by tuberculosis of mediastinal lymphatic glands raises doubts as to the correctness of some diagnoses of the latter condition.

In the case of actinobacillosis the cause of the tympany when the disease does not involve the cardiac region or oesophagus, remains obscure. Case No. 24 excepted, *post-mortem* examination of cases showing tympany did not, as might have been expected, disclose gross secondary involvement of associated lymphatic glands or of lymphatic glands within the thorax.

An attempt made to assist diagnosis by haematological methods proved fruitless.

Acute Tympany with Froth (Frothy Bloat)

In Lanarkshire this condition is met with mainly on clover pastures, aftermath of hay, on a diet of swede or turnip tops, marrow-stem kale and less frequently when concentrates are given in large bulk.

While it has long been recognised that many of the above foods are potentially dangerous, the factors involved in the production of the condition are imperfectly understood. The intimate chemistry seems to indicate that there is a speeding up of the normal fermenting process in the rumen concurrently with a marked reduction of the surface tension of the ruminal fluids. The gases are trapped as formed and while ruminal movement is not interfered with, eructation does not take place or is insufficient to cope with the rapid accumulation of froth. The increased saponin content of partly decayed fermentable foodstuffs or the actual synthesis of saponin or soaps within the rumen seems to be the root of the problem.

The symptoms are invariably sudden in onset. Within half to one hour of eating the implicated food, affected animals may show symptoms so severe that urgent and drastic measures are necessary to prevent death. There is an alarming abdominal distension and the animal is in great distress. Death is usually due to asphyxia, although one case seen in 1949 died presumably from shock following an 18-inch rupture of the right abdominal wall with prolapse of almost the whole intestines. Less severe cases show distention and discomfort with crouching or kicking.

Treatment

Treatment of the less severe case has two aims:—

1. To resolve the foam so that eructation may give relief.
2. To depress fermentation.

A very great variety of drugs have been used with these objects in view, but with variable success. Ol. terebinth. in 2 oz. doses or formalin in 1 oz. doses are possibly superior to most.

Recently, Quin and others[5] have suggested that the only rational treatment should be the administration of agents with the property of increasing the surface tension of fluids. 115 out of 155 cases of bloat given 100 c.c. of a highly polymerised methyl silicone showed complete recovery in a short time, particularly when the agent was given by direct injection into the rumen.

Personal experiences of the use of a commercial anti-frothing agent of a similar nature have been disappointing.

When medical treatment is unavailing, or when the urgency is great, recourse must be had to the trocar and cannula. It is always advisable in cases of this type of tympany to incise the skin before using the trocar, to prevent an unsightly if harmless accumulation of gas under the skin. One should not expect an immediate improvement to safety level after trocarisation and this may not take place for half to one hour. Sometimes tapping is insufficient to give relief, and there should be no hesitation in performing rumenotomy and removing a considerable volume of the contents.

Acute Impaction and Autointoxication

Acute impaction of the rumen arises only through overeating. Autointoxication supervenes when the foodstuff concerned has been of a concentrated nature. Impaction without toxic symptoms may arise through overloading of the rumen with such foods as dried beet pulp. On the other hand, the accidental access to concentrated foods, *e.g.*, oats or other grains, legume products or oil cakes may produce serious illness, a similar condition being readily set up by the deliberate administration of an over-feed for exhibition or milk records.

The symptoms may vary slightly according to the type of food and in severity according to the amount of starch or protein consumed. The affected cow may or may not have an evident distension of the rumen and will be dull and uncomfortable. This is soon followed by diarrhoea, groaning, recumbency, subnormal temperature, greatly accelerated and weak pulse, coma and death. Death usually takes place 36 to 48 hours after consumption of the food.

Treatment

The treatment of this condition is approached with

caution. An endeavour should be made to estimate the amount of concentrate consumed. If this is in the region of two or three times a normal ration expectant treatment will lead to early recovery. If it is greatly in excess of this, the only possible hope of securing recovery is in performing rumenotomy. If, however, the intoxication has progressed to the stage of recumbency recovery is unlikely. Unfortunately most cases are not seen until 24 hours or so after the harm has been done, since only occasionally is the danger immediately apparent.

Purging is inadvisable and unhelpful.

Traumatic Reticulitis and Its Sequelae

Traumatic conditions undoubtedly constitute the great majority of primary gastric troubles in the cow. Formston[6] puts the figure at 95 per cent. of all stomach troubles, but a more conservative estimate does not lessen the importance of what amounts to a major disease.

Symptoms

Penetration of the reticular wall by a sharp object invariably produces sudden symptoms of acute localised peritonitis. There is high fever, increased pulse-rate and rigor. Tension of the abdominal muscles gives the animal a "tucked-up" appearance, although the abdominal circumference is not reduced and may even be increased. There is complete ruminal atony with a variable degree of tympany. Appetite and rumination are in complete abeyance and if the patient is a cow in milk there is a sudden and very marked fall in the milk yield. The back may be slightly arched and there is great disinclination to move, any movement made being done cautiously and woodenly. A short painful grunt may be heard or may be produced by increasing the abdominal pressure. A premeditated pinching of the withers or pressure on or percussion of the xiphoid region may elicit this grunt and the latter manipulations are greatly resented. Bowel movement is absent or very slight and urination is suppressed, the latter act in particular causing an increase of the painful grunting symptom.

This syndrome is unmistakable and justifies an immediate diagnosis of traumatic reticulitis with peritonitis. The immediate sequelae may vary as follows:—

1. Complete disappearance of all symptoms within 24 to 48 hours indicating a healed lesion and retraction of the object.

2. Gradual lessening of the symptoms with a return to normal health in three to ten days. This denotes a slowly-healing lesion with the probabilty of the object persisting in its penetration.

3. Increase in the severity of the illness, indicating continued penetration and increase of infection, with the probable supervention of an acute diffuse peritonitis or of chest complications of pleurisy or pericarditis.

Diagnosis

Diagnosis is based on the typical symptoms and presents little difficulty in the early case. Cases showing a degree of resolution or cases of some standing may give more difficulty, chief reliance then being placed in a demonstration of regional pain and the elicitation of a pathognomonic grunt.

The interpretation of a total and differential leucocyte count.—In suspected cases the blood picture has been shown[7] to provide considerable assistance in diagnosis and prognosis.

In the early stages of reticulo-peritonitis the total white count is within normal range, but there is a relative neutrophil leucocytosis and the appearance of an abnormal proportion of unsegmented neutrophils. An increase in the total white count is found to co-exist with acute diffuse peritonitis or suppurative processes in the pericardium or pleura; it indicates a probable fatal termination. Eosinophilia justifies a favourable prognosis; a continued eosinopenia is a grave sign.

A blood picture showing no deviation from normal limits suggests that there is little basis for suspecting a traumatic condition.

The Metal Detector.—Recently, adaptations or modifications of the war-time mine-detector have been used to assist in the diagnosis of traumatic gastritis. Their value is at the most strictly limited. Metal detecting instruments may give false negative results through having insufficient sensitivity; positive reactions may be produced by harmless metallic objects in the reticulum. A penetrating object may be non-metallic and even non-metallic objects, such as pieces of "road-metal," may produce a reaction in a sensitive instrument.

Exploratory operation

In cases where doubt still exists exploratory rumenotomy is justifiably indicated.

Differential Diagnosis

Traumatic gastritis should not be confused with acetonaemia, an occasional case of which may show a pronounced arching of the back. In acetonaemia rumination is persistent and there is a continuing appetite for fodder. The flanks are distinctly hollowed and there is no abdominal tenseness. Rothera's test for acetone is strongly positive.

Some cases of acute metritis and of metro-peritonitis may closely resemble traumatism. Grunting may occur, and the fever, pulse-rate and evident severity of the illness cause confusion. Examination of the uterus in a recently calved animal is always a good maxim, but it should be remembered that the immediate *ante-* and *post-partum* period is a prolific producer of recrudescences of old-standing traumatic lesions.

Peritonitis from external trauma, *e.g.*, horn wounds, vaginal or rectal penetrations, may readily lead to false conclusions being drawn as to the cause. Recent penetrations of pelvic organs are, however, usually characterised by the animal "carrying its tail."

A superficially resembling, and sometimes confusing, syndrome may be shown by the animal with painful feet. The attitude and outward appearance of unthriftiness and discomfort suggest a "foreign body." The lame cow prefers to lie; the cow with a "wire" prefers to remain on her feet.

Treatment and conclusions

Of recent years, and particularly since the advent of the sulpha drugs and penicillin has made major surgery on the farm a reasonably safe prospect, there has been an astonishing increase in the practice of performing rumenotomy for the relief of traumatic indigestion. The operation is simple and safe. Unfortunately many veterinary surgeons who have had considerable experience of traumatic reticulitis without having recourse to operation are still unconvinced of the wisdom of operating. Their main argument is that removal of the offending object does not alter the prognosis of the individual case. In other words, if the original penetration is slight the symptoms will disappear spontaneously; if the penetration and infection are severe, operation merely hastens a fatal termination.

XUM

While it is admitted that a " wait and see " policy will give very good results in a large proportion of cases, it cannot but be disconcerting to find, for example, a developing pericarditis in a case in which previously diagnosed " foreign body " symptoms had " cleared up." No argument can circumvent such a situation, and so long as the danger exists and one cannot give the assurance of there being no possibility of a recurrence of illness with serious consequence, so long will there be the justification for rumenotomy.

The greatest obstacle to an even more frequent performance of rumenotomy is, of course, a natural reluctance to undertake an operation with the definite object in view of removing an offending piece of metal, with the possibility that it cannot be found because it either never was there or has left the stomachs for parts unknown. This reluctance is in inverse proportion to confidence in diagnosis and by the time the cautious clinician takes up the scalpel irreparable damage may have been done or the object of search be out of reach.

Among the various factors upon which depends the value of operation for the relief of traumatic reticulitis and its sequelae is the attitude of the clinician towards the operation.

The first type of attitude is that adopted typically by the teacher of veterinary surgery. It is based, somewhat idealistically, on early diagnosis and immediate operation, and preaches the futility of operating on old-standing cases and cases showing severe illness at the time. Admirable as it is, this attitude does not take into account the unfortunate inability of farmers and dairymen to diagnose every early case of traumatic gastritis and the tendency of the early severe symptoms quickly to be masked and so go unnoticed. Consequently the cases presented always contain a high proportion of inoperable acute sequelae or of recrudescences of previously partly-healed lesions. Too often it is the experience of the attending veterinary surgeon that even an early diagnosis finds the condition of some standing and the offending object inaccessible.

The second attitude of mind regards the operation as expedient only in cases showing severe illness (*i.e.*, those that have not responded to expectant treatment). Many cases of this type are inoperable and the recovery rate in operated cases is considerably lower than in those cases in which a " wait and see " policy has resulted in improvement. If none but the severely ill animal is operated on, the startlingly high death rate will discourage operator and owner alike and the operation will fall into a disrepute it does not deserve.

A third attitude may be adopted. It is to regard the operation primarily as exploratory, with the object of finding out the state of affairs within the fore-stomachs, removing if possible the cause of present or future harm and giving after operation an accurate diagnosis and reasoned prognosis. It is maintained that a more widespread adoption of the exploratory approach will result in a better appreciation of the value of the operation, in that it is undertaken without hesitation and early, even in cases of doubt. Fatal sequelae will be less common and success will result in a speedier reporting of suspected cases.

Pathological Conditions Affecting the Abomasum

Abomasal inflammation or true gastritis is infrequent in cattle on a normal diet. It does occur, however, in the following circumstances:—

(*a*) As part of a gastro-enteritis due to irritant poisoning.

(*b*) As part of the syndrome of certain specific diseases, notably pasteurellosis, malignant catarrh.

(*c*) As a consequence of parasitism.

An acute abomasitis of uncertain aetiology is more rarely encountered.

Symptoms

Acute abomasitis is characterised by a sudden complete loss of appetite and cessation of rumination. The temperature is variable, a very high fever being usual when the condition is infective in origin. The pulse is full and bounding. There is usually excessive thirst and there may be salivation and teeth-grinding. The eye is at first full and staring and the mucous membrane of the mouth is a bright pink. Faeces are at first suppressed. There may be grunting and an indication of pain in the right hypochondrium. Later the pulse becomes weaker, the eye sunken, the external and internal temperature low and the faeces passed are fluid and foetid or of a tarry colour and consistency.

Superimposed symptoms of inco-ordination, tetany, amaurosis, excitement, etc., indicate a probable toxic origin. Continued fever points to the probability of the condition being part of an infective syndrome.

Treatment

The treatment of acute abomasitis or gastro-enteritis should be directed towards neutralisation of the cause, and the adoption of such measures as will promote resolution of damaged tissues. If the cause is a toxic substance the administration of antidotes where available and general nursing measures are the only indications. Infective conditions are treated as such and the gastric manifestations ignored. In all cases the temptation to use a purgative because of continued constipation should be resisted.

While of little more than academic interest, an occasional encounter with such conditions as abomasal displacement, ulceration of the abomasum, pyloric obstruction with impaction or with tympany and haemorrhagic abomasitis causes so much difficulty in diagnosis that a few remarks are considered necessary.

Displacement of the Abomasum

The cause of this accident is uncertain. The author has observed the condition in three instances only, in each case the abomasum being found between the rumen and the left abdominal wall. In one case the dislocation was found on laparotomy of a cow showing atypical but suspicious symptoms of traumatic disturbance. Replacement was effected after removing a considerable volume of the ruminal contents, but the manipulative interference caused a chronic peritonitis and the case gradually deteriorated after a primary improvement. Two cases showed inappetence and decrease in the passage of faeces with the appearance of a tympanitic viscus at the border of the last rib on the left side and a large area with a pronounced tympanitic resonance in the region of the lower half of the posterior ribs.

The withholding of all food for two days in these cases resulted in return to normal.

Ulceration of the Abomasum

Ulceration of the abomasal mucous membrane is said to be secondary to inflammatory processes and may produce obscure digestive disturbance. Diagnosis in life is unlikely. One case showed an intermittent tympany and vomiting and at *post-mortem* examination three circular ulcers 2 inches in diameter in the abomasum.

Pyloric Obstruction

Spasm of the pylorus secondary to traumatic peritonitis

has been encountered, producing impaction of the abomasum and the appearance of symptoms of auto-intoxication. Tympany of the abomasum has been observed on several occasions co-existing with an haemorrhagic abomasitis. The tympanitic viscus has been palpated at the border of the last rib on the right side, sometimes also per rectum, and give rise to a marked resonance on percussion of the region. The faeces are entirely absent or small in amount and tarry. Several cases of this type have shown spontaneous recovery after some days.

From a consideration of the whole picture of stomach disturbance in the cow the following features emerge:—

(*a*) That the most common cause of inappetence is acetonaemia.

(*b*) That traumatism is responsible for by far the greatest number of obscure stomach disturbances.

(*c*) That tissue changes in the gastric compartments are infrequent; and

(*d*) That, given reasonable diet, gastric dysfunction is unlikely.

A review of the older literature on the subject shows a great tendency to place reliance on purgatives, stomachics, carminatives, tonics, etc. Even recent reports of individual cases contain unblushing references to the administration of purgatives to cases ultimately found to be traumatic in origin.

In the opinion of the author there are no indications for purgation in the cow. A cow is never ill because of constipation; she is constipated because of illness. In addition, the complex gastric organisation in the ruminant makes purgation useless as a method of removing offensive material from the fore-stomachs and, in fact, it merely serves to increase gastric dysfunction.

As mentioned earlier, atony and impaction are symptomatic only and are not considered as pathological entities. The author's experience of the use of so-called stomachic stimulants and tonics has long since shown them to have very little value in the treatment of gastric disturbance. Their use, indeed, amounted to an acknowledgment of failure to diagnose the pathological condition present.

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The Chairman now called upon Mr. Morgan, the first of the openers of the discussion.

Discussion

Mr. A. T. Morgan, M.R.C.V.S., D.V.S.M. (Carmarthen): May I, first of all, thank the Provisional Committee for the honour they have conferred on me in inviting me to open this discussion. The only qualification I feel I possess to merit this honour is that I am a member of the South Wales Division, and the Provisional Committee felt that a member of this Division should be invited to participate in the deliberations of this Congress.

I must congratulate Mr. Begg on the quality of his paper. Of all the problems encountered by a veterinary surgeon in cattle practice, accurate diagnosis of disorders of the rumen in the adult bovine presents the most difficult. These conditions call for the keenest powers of observation, examination and also for the thorough questioning of the owner or attendant. It cannot be emphasised too severely that, unless early and correct diagnosis is made, death of the patient with consequent damage to one's reputation may result. Wrongful treatment such as administrating large doses of Epsom-salt, linseed oil or turpentine may also result in death, whereas early resort to surgery would have successful results.

Whereas it was once thought that acetonaemia was the commonest condition of rumen dysfunction met with, it is now accepted to be only a symptom and leaves the atonic and chronically tympanitic rumen to be the greatest problem to the diagnostician. This state of the rumen, often accompanied by a grunt of varying severity, calls for the most severe of examinations, so that one can decide early whether to search for a foreign body, to treat for actinobacillosis, or to administer tonic and resort to expectant treatment.

Differential diagnosis still presents great difficulty, and one agrees with the author that the present form of metal detection is not helpful. One would welcome the day when the modern form of portable X-ray could be made of sufficient strength to "photograph" a foreign body in the cow's fore stomach. There being, therefore, no positive diagnostic method of obtaining a "yes" or "no" as to the presence or absence of a foreign body in the reticulum, one is strongly in favour of the author's suggestion of regarding the operation of rumenotomy as being primarily exploratory. Indeed, this attitude has been adopted for a number of years with good results. The following two cases are reported to show what success can be obtained by resorting to exploratory surgery:—

1. An aged Shorthorn bull when first seen showed a temperature 104° F., complete loss of cud and slight tympany; tonics were administered and the animal was visited 24 hours later when the condition had become gradually worse, a grunt had developed and the presence of a foreign body was queried. Rumenotomy was discussed with the owner and it was decided to delay operation for another 24 hours. Examination on the third day showed greatly advanced symptoms, a much more pronounced grunt, and complete loss of appetite—cudding had not been observed since the first visit. Rumenotomy was performed, a thorough search was made for a foreign body with complete failure, and the rumen was sutured. The hand was then passed downwards and forwards over the peritoneal surface of the rumen towards the liver, where one was surprised to find the rumen adhered to the liver. These adhesions easily broke down under slight pressure of a finger and this was carried out until the whole area was felt to be clear and final suturing of the abdominal muscles and skin was completed at about 4.30 p.m. The owner observed the bull cud at 8 p.m. and recovery was complete and uneventful.

2. The second case of this nature was a Red Shorthorn cow, which again showed similar symptoms to Case 1 in which one did not feel too certain that a foreign body was the cause and exploratory surgery was decided upon. Just as in Case 1 no foreign body was found, but an area of adhesions existed between the rumen and liver. These were again broken down and recovery was completed.

Another cause of failure of cases to respond to rumenotomy may be encapsulation of the foreign body.

It would be of interest to know whether the author, or any other members have met this condition, as one wonders whether the adhesions are the result of a foreign body having been present and either retracted or changed its course, or were they due to an inflammatory process from some other cause? The only reference found in the text-books on this subject is in "Sisson's Anatomy," where a brief footnote refers to a condition of adhesions of liver to rumen and expresses the opinion that it is a pathological condition.

The author states that cudding is completely lost in cases of traumatic reticulitis, and while it is agreed that this is generally so, one recalls that operation for search of a foreign body was once deferred because the cow was seen cudding yet death occurred two days later and *post-mortem* examination revealed penetration of the heart by a wire.

Grunting as a symptom of the presence of a foreign body needs to be examined very carefully, it being thought extremely difficult to distinguish between the numerous other diseases where this is present. During recent years a number of cases of endocarditis have been met with, one of the symptoms of which is a "grunt"

quite like that met with in "foreign body." Differential diagnosis is assisted by the fact that whereas in endocarditis the appetite is impaired it is rarely completely lost and the cud, though not so regular, is usually retained. The frequency of this pathological cardiac condition was first brought to our notice by Mr. Rees Evans, of Aberystwyth, following his detailed examinations of bovine carcases at knacker yards, and his observations have been of great value to us in obtaining an early diagnosis.

Peritonitis following rupture of the dorsal surface of the uterine body after a difficult dystokia was once observed and produced symptoms which could have been compared with the grunt and taut abdomen usually present in the foreign body case; one also recalls an exploratory rumenotomy which, upon exposing the rumen, revealed the peritoneal surface to be covered with gross lesions of tuberculosis revealing a tuberculous peritonitis.

Tympany of the rumen not associated with foreign body is frequently met with, and it is agreed that if acute, resort to the cannula is indicated; if this is not successful then one should perform rumenotomy. The consistence of the digesta is believed to be determined greatly by the type of food ingested; such concentrated foods as cake and meal, particularly barley meal, have been found to produce a rumen content of a fluid nature which readily passes through a large cannula and will relieve the pressure in the rumen considerably. Often, however, the frothy material associated with the ingestion of clover and aftermath will not pass through a cannula and only rumenotomy is found successful. Mr. Begg states that once the state of recumbency is reached, death is the usual result. One cannot agree with this, for it has been experienced that resort to rumenotomy in really advanced recumbent cases can be successful. The following case is recalled because of the advanced "blown" state of the rumen and of its successful termination following delayed suturing of rumen and abdominal wall.

3. A pedigree Friesian cow was visited at 8 p.m. on a Friday. On arrival into the box the patient was found to be recumbent, abdomen greatly enlarged, eyes sunken, horns and ears cold, the whole picture being of a cow *in extremis* and bordering on collapse. A bold incision, about 7 inches long, was made straight through skin and abdominal muscles, with the result that the rumen contents literally shot 8 feet in the air and in quantity more than filled an average-sized wheelbarrow. The effect of this sudden release of inter-rumenal pressure was really spectacular; the cow breathed heavily for a few minutes, then the eyes improved in appearance, the patient becoming "easier," and recovery was obvious; within ten minutes the cow was on her feet. It was decided not to close the wounds that night and the next visit was made 36 hours later when the wounds were cleansed and sutured. Healing was not by first intention, there being a fistula which was closed up one month later, after which recovery was gradual but complete.

To the veterinary surgeon who is timid and over-cautious, one can say that death from rumenotomy, of itself, is very unlikely indeed and in any case of doubt one should not hesitate to open the rumen.

So many cases of bloat terminate in sudden death before advice or attention can be given that it is now the practice to inform clients of the dangers involved and to advise them to open the "stomach" sufficiently in acute cases where no relief is obtained from the usual penknife wound.

The author's references to actinobacillosis of the stomach are of great interest, although one is of the opinion that sodium iodide given intravenously supersedes potassium iodide by the mouth, it being felt that Case 3 as reported would be endangered with iodide poisoning, whereas equally good results would be expected from, at the most, two courses of sodium iodide given intravenously. Both in cases of chronic tympany of doubtful origin and vomiting, the intravenous injection of sodium iodide has for some time been found to give good results. The following two cases are reported out of many that have been successfully treated in this way.

4. A pedigree Jersey bull was first seen to be "blown" at an agricultural show and was treated by the veterinary surgeon in attendance. At home the next morning the bull was still "blown" and was given a purgative by the owner. Concentrates were withheld, hay and water only being allowed, but the animal remained "blown" to a varying degree for a whole week. On the seventh day assistance was sought and sodium iodide was given intravenously with the request that one was to be notified the following day if the condition was not improved. No notification was received, and when the owner was seen one month later it was learned that the rumen had assumed its normal state the day following the injection and had remained so ever since.

5. A Shorthorn bull at the local A.I. Centre was observed to be vomiting periodically, its manger invariably being full of rumen contents. Large doses of potassium iodide were given by the mouth for 14 days with no improvement. It was then decided to give sodium iodide intravenously; vomiting ceased the following day and, upon enquiry two months later, the bull still remained normal.

Unfortunately, tympany of the rumen can occur from other causes which cannot be treated so successfully, and under this category one recalls two such cases, due to obstruction of the oesophagus by a sheep's cervical vertebra. Diagnosis of the obstruction in both cases was made, first by failure to pass the stomach tube, and secondly the probang. Both cases terminated in the slaughterhouse, where positive diagnosis was made.

The dairy cow is almost universally of chief economic importance on the farm to-day, and when trouble is met with in the form of disease it is from the veterinary surgeon that relief is sought. It is important, therefore, that he should do his utmost to diagnose correctly, and so apply early and proper treatment so as to reduce the period of illness to a minimum, and by so doing reduce the animal's period of unproductiveness to the least possible.

The second opener of the discussion was Mr. D. G. E. Davies, M.R.C.V.S., of Llandyssul, who said: I would like first of all to add my congratulations to Mr. Begg for a most valuable paper on some of the most common conditions seen by those of us engaged in cattle practice.

Diseases of the ruminant stomachs constitute a very considerable portion of large-animal practice, especially during that period of the year when the animal is on winter food, *i.e.*, from October to April. I propose in this opening to deal only with those conditions which I have found to be the most prevalent in our practice over the last seven years:—

1. Impaction of the Rumen and Atony of the Rumen.
2. Traumatic Reticulitis and Peritonitis.
3. Rumenal Tympany—bloat.

I am personally of the opinion that by far the greater proportion of diseases of the fore stomachs is due to impaction and atony of the rumen and is not, as is commonly stated, the result of foreign body penetration. I say this upon careful consideration of the number of cases of stomach disorders, the symptoms shown and the percentage of recoveries without recourse to operative interference.

I would like to deal, firstly, with the disease which I consider the commonest of the fore stomach disorders, *viz.*:—

Impaction of the Rumen.—A chronic or sub-acute form of rumenal impaction may often occur through the prolonged feeding of fibrous and indigestible foods, *e.g.*, straw chaff and poor quality hay with a large concentrate ration. Although the bovine rumen is well adapted for the digestion of fibre, a chronic form of, firstly, overloading and, later, impaction occurs. This syndrome is usually seen in the winter months when animals are indoors and are, therefore, having little exercise. The primary symptoms are inappetence, cessation of rumination and constipation. The rumen is enlarged, too firm to the touch and atonic. If the symptoms proceed, auto-intoxication occurs and very marked dullness and depression manifest themselves. The initial temperature is usually 102·5° F. to 103·5° F. A sudden depression of temperature to under 101° F. is always a very serious symptom, indicating that auto-intoxication has occurred and in this case a serious prognosis should always be given.

In a normal case treatment consists in withholding food, although usually this is not necessary as the appetite is very poor. The animal should be kept warm and stimulant and purgative powders should be given. While agreeing with Mr. Begg that strong purgatives are rarely, if ever, indicated, I am of the opinion that twice daily administration of stimulant and purgative powders is definitely indicated in these cases which I shall term—*Sub-acute Rumenal Impaction.*—The powders normally used by me consist

of 1 drachm doses of aloes and nux vomica and 2 drachm doses of ammon. carb. with ginger and gentian and given night and morning. This should be combined with thorough massage of the rumen, kneading it well with the closed fist gently but firmly every four hours for a period of five minutes at a time. Recovery in these cases usually commences in two to four days following the onset of treatment. The diet for the convalescent period should consist of easily digestible foods with a liberal allowance of bran mashes.

If recovery does not commence after three to four days rumenotomy is definitely indicated to remove a portion of the rumen contents. If this is too long delayed the chances of recovery are remote. Rumenotomy should not be performed if the temperature has fallen to under 101° F., if the extremities are cold and if depression is very acute. In this case the prognosis is too serious and the operation will only hasten death.

In my opinion the above syndrome forms the commonest type of fore stomach complaint and is related to (*a*) the quality of the fodder; (*b*) the quantity of concentrates.

I shall be grateful for Mr. Begg's observations on the relation of the nature and quality of the food to the incidence of rumenal disorders.

I shall now turn to *Traumatic Reticulitis*. It is my considered opinion that the incidence of this complaint does not constitute the majority of gastric troubles in the bovine. I say this upon careful consideration of the proportion of recoveries in so-called cases of indigestion without recourse to operative interference. I feel that the diagnosis in many cases of traumatic reticulitis is definitely not easy and requires very keen clinical observation. It is assumed, as Mr. Begg states, that when cases which on first diagnosis were thought to be traumatic, recover without operation, the offending foreign body has become loose from the reticular wall. I am sceptical about this, considering that the course taken is often forwards towards the heart, and in such cases have often believed my primary diagnosis to be incorrect. Of many dozen so-called "indigestion" cases treated during the first three months of this year only two cases proved to be foreign body cases requiring operative interference. The remainder of these cases either recovered with treatment or, in those cases which reached a fatal termination, the presence of a foreign body was disproved at *post-mortem* examination.

Whenever I have to treat a suspected foreign body case my first action is to have the front legs of the cow raised about 4 inches to 5 inches by means of boards, etc. I shall be grateful for Mr. Begg's view on this procedure. Is it his opinion that the action helps to retard the forward movement of the foreign body and also is it possible that in this way the offending object is detached from the reticular wall and that thus the symptoms abate?

The following symptoms have been found to be very suggestive of a foreign body:—

(1) A continuous grunt which gives the instant impression of pain being continually felt. How does Mr. Begg differentiate this grunt from that found in pleurisy?

(2) The rumen is not over full and this differentiates from impaction of the rumen.

(3) Pronounced pain on applying pressure on the reticulum—just behind the xiphoid cartilage. The cow responds strongly and resents pressure in this region, not only by grunting very markedly but also by kicking with the hind legs.

I may point out that I have not myself often seen a high temperature as amongst the earliest symptoms in traumatic reticulitis. I would like to know what temperature Mr. Begg expects to find in an early case; also, how soon can pulmonary and heart symptoms supervene after the primary symptoms have been seen?

I agree with Mr. Begg that the uterus should be examined whenever there is the slightest difficulty in diagnosis. I always make it the practice to examine the uterus in the pregnant and newly calved cow if diagnosis of an abdominal disorder is at all difficult.

Actinobacillosis of Rumen and Reticulum.—While I have no actual knowledge of this condition, may I suggest that oral treatment, using iodine instead of pot-iodide, might prove of greater value. In our practice actinobacillosis of the tongue is treated with iodine prepared as follows for an ordinary sized cow:—½ oz. iodine plus ½ oz. pot.-iodide in 8 oz. of water; ½ oz. of the preparation is given as a drench daily in 1 pint of water, thus giving a daily dose of 15 gr. iodine. Sixteen daily doses of this preparation prove successful in the great majority of actinobacillosis cases.

I feel certain that this portion of Mr. Begg's paper is most valuable and will provide many of us with a new approach to many confusing gastric troubles.

Acute Tympany.—This condition of the rumen, as Mr. Begg states, can be due either to feeding on clover pastures or aftermath or, more rarely, to the excess feeding of concentrates. Unless the rumenal contents are mixed too intimately with the gases, considerable relief can often be afforded by passing the stomach tube and I have witnessed some very rapid recoveries using this method. If, however, the bloat is very frothy and the mixture is very intimate, the stomach tube will prove useless, and if the case is very severe, the trocar will have to be used; even then escape may be difficult with the cannula becoming continually clogged.

There are one or two points I would like to raise concerning the prevention of bloat on clover pastures. Cattle should not be turned on to clover pastures when they are wet or damp. During the recent damp weather we have seen very many cases of bloat on clover aftermaths. I always advise a feed of hay before turning into the clover and also to feed off the clover first when it is dry, as fermentation is then very considerably less and danger from excessive formation of gases is remote.

I have only one question to ask concerning inflammation of the abomasum. When diarrhoea supervenes, should a copious supply of fluids be given or should they be rationed? I am personally of the opinion that a plentiful supply of fluids should be available, as very considerable quantities are continually being lost with the faeces.

I should like, in conclusion, to thank Mr. Begg once more for a very practical paper and am looking forward to a keen and stimulating discussion.

General Discussion

Mr. J. M. Ingram (Oxted): I would add my quota of thanks to Mr. Begg. I agree with many of his statements about indigestion and would like to see his suggestions acted on more often in practice. I would like to ask Mr. Begg if he does consider foetal membranes to be an abnormal meal. I think it is normal and the only danger I have seen is where part of the membranes spread over the entrance of the epiglottis and choke the animal, otherwise I consider the cow can derive benefit from the ingestion of the foetal membranes.

I agree with Mr. Begg about the impaction of the rumen, and I do not think it occurs often, except in the specific cases given.

I am interested in cud dropping and would like to know what Mr. Begg uses for treatment. I have considerable difficulty in understanding why it should occur, and I am also interested in Mr. Morgan's suggestion that it might respond to sodium iodide.

With regard to the differentiation of the grunts associated with chest conditions and abdominal pain, it is essential to note that the grunting usually associated with a foreign body is of a very low intensity, and very often can be heard only on auscultation. The pain caused by penetration of a foreign body is intensified by movement and the cow is actually frightened to move; she stands in an arched attitude, and moves neither to right nor left.

Another point which helps diagnosis is the breathing, which, in my opinion, always will be extremely shallow—in fact so shallow that it can border on being imperceptible. I would query the statement that a high temperature is always present in the initial stages of foreign bodies. I have been very much surprised to find just how low the temperature of the bovine can be with peritonitis, and I have seldom seen the temperature exceed 103° F. As far as the differentiation is concerned, I think the pulse rate is more important.

I should query Mr. Begg's use of Rothera's test as a differential diagnosis of acetonaemia and a foreign body. I have frequently found a cow affected with a foreign body to be positive to Rothera's test. Many will not agree that acetonaemia is the most common cause of inappetence, but would agree that ketosis very often follows inappetence.

Without questioning the value of the operation for the removal of a foreign body, which is a very worth-while operation, the board treatment frequently will give immediate relief, and if it does not do so within 48 hours, then the operation should be considered.

Mr. Davies asked Mr. Begg, how quickly does the foreign body

penetrate? If I might give one case met with in the past year: it is that of a perfectly normal cow, giving the normal amount of milk in the morning and afternoon, and when being bedded down that evening was found to be in pain, and a visit requested. It was Sunday evening, and when asked how long the cow had been ill, I checked up the milk record sheets, and they were obviously quite normal. I advised them to put the cow on boards, but had a message within two hours that the cow was dead. This rather perplexed me because she was not obviously a dying cow when I saw her. On *post-mortem* examination I found the cow had ingested a piece of extremely sharp steel wire, usually associated with balloon apparatus used to bring down flying bombs; it had gone straight through and penetrated one of the main vessels, and there was terrific haemorrhage into the pericardium; death had occurred within three or four hours of initial onset.

With regard to impaction and auto-intoxication, as Mr. Begg calls it—I prefer to call it protein poisoning—following on the ingestion of large quantities of concentrates, I agree that the owner very seldom sends for you before 48 hours when the acute symptoms of diarrhoea appear. With a recumbent cow in such cases as these and with a sub-normal temperature, I would prefer to give calcium glucose or glucose intravenously, and have found that heat treatment by means of an electrically heated cattle rug is a useful adjunct; in fact the results you will get are absolutely remarkable.

I have had very little experience of actinobacillosis of the rumen; we have had a few, but I have not had many post-mortems. Having ruled out a foreign body, Mr. Begg has given us a very nice synthesis of this condition. I think I prefer to give sodium iodide rather than do rumenotomy initially. I am very intrigued by the fact that Mr. Begg does not mention the use of sodium iodide intravenously, and I would like to know his reasons.

I am also, like Mr. Morgan, interested in Case No. 3, which, after exploratory rumenotomy, was given sodium iodide for six weeks before improvement commenced. I would like to know the dose, and did the rumenotomy retard recovery?

Displacement of the Abomasum.—Mr. Begg mentioned tympany; I would like to ask whether any torsion of the abomasum was present. I have seen one case. Mr. Hignett abstracted a series of these cases for *The Veterinary Record*: unfortunately *The Veterinary Record* only arrived in time for me to suspect the diagnosis the day the animal was put down. In this case there was rumenal tympany of quite an unusual kind, it was a distinct tympany of the right side. This case started off with a fast pulse, 100, and went on; the faeces were very tarry and chocolate coloured; then later on the animal drank an immense amount of water and a sort of bile-yellow diarrhoea followed. In this abstract no details were given as to the operation, but I gather this condition could be operated on and the site would be approximately that used for the removal of hair ball in the calf.

Pyloric obstruction, or spasm tympany, especially of the right side, with small amounts of tarry faeces, is again mentioned. Were these cases torsions of the abomasum?

In diseases of the abomasum, I have had two cases of ulceration of the abomasum without many symptoms. In one case the animal, apart from losing some degree of condition, showed no other symptoms at all; she had been milked and was being turned out, and she suddenly dropped dead on the way to the field. Here ulceration of the abomasum involved a blood vessel which had bled profusely and death was due to haemorrhage.

Another case was that of a heifer, recently calved, in very excellent condition, which suddenly showed acute pain; when seen a few hours later she was *in extremis* and was destroyed. In this case there was complete penetration in two places of the abomasum with diffusion of the stomach contents throughout the abdomen. Although specimens were sent to the laboratory for an investigation no explanation could be given as to the cause. I was struck by the fact that such ulcerations could occur previous to the rupture without any obvious symptoms.

I must agree with the author about the indiscriminate use of purgatives; on the other hand, I disagree with the statement that so-called stimulants are of little value.

Mr. A. J. Wright (Macclesfield): I would first like to congratulate my old friend Mr. Hugh Begg on such an excellent paper. However, I am afraid my views and his do not agree on many points, and I am sure he will forgive me when I say that my views and experiences are more in agreement with those of Mr. Davies. I feel I must congratulate Mr. Davies on his excellent "opening" of this paper, both on the substance and the manner in which he has presented his findings and views.

My views and observations are almost identical with those of Mr. Davies, and therefore I will not repeat them again here, but I would like to make one or two general remarks.

Firstly, I feel it is necessary to issue a warning, especially to our younger members, with regard to resorting immediately to operation in every case of disorder of the bovine stomachs. Personally I feel some of our members—I may be wrong—are simply operating on every cow which shows the slightest sign of rumenal disorder or grunting, and in many cases the operation is coming into disrepute. I know one gentleman who was doing practically 20 a week, which in his own practice, multiplied, becomes nearly a thousand a year. We must be having a devil of a lot of wired cows in this country! (Laughter.) I feel, generally speaking, this operation is not one of terrific urgency, in spite of the case quoted by Mr. Ingram which is an exceptional one. (Mr. Ingram: It would have died.) I do feel many of us should wait a day or so, and make a very careful clinical examination before deciding on the operation.

As stated before, my views agree almost entirely with those of Mr. Davies. Mr. Morgan mentioned one case of tuberculous peritonitis. Here I would like to issue another little note of warning. In the two cases I did operate on—I thought at the time, wrongly, they were cases of traumatic reticulitis—I encountered a very diffuse peritonitis which to me appeared tuberculous; it was diffuse and it spread over the whole peritoneum. It was a tremendous shock to me, inasmuch as it was in an attested herd, and the cow had passed the test within the last month or two. I was confident it was tuberculous peritonitis, and I was very unwise in expressing that opinion to the owner. Anyhow, we retested her a little later on, and she was negative, and a bacteriological examination of the specimen sent failed to reveal any sign of bovine tuberculosis.

The other case was a similar one in appearance. Here the examination revealed avian tuberculosis.

I must thank Mr. Begg for his remarks on actinobacillosis. I am very interested, and I think probably a number of cases of recurring sub-acute tympany are due to this cause. I would like to ask him if he has had any experience in the treatment of this condition with the subcutaneous or intravenous injection of sulphamezathine, because we are using this drug more and more now for the treatment of actinobacillosis of the tongue and cheek, with surprisingly good and spectacular results.

I wish to thank the authors and openers for their excellent contributions.

Mr. George W. Begg (Wickham): I should like to congratulate my cousin on a most excellent paper. In my own professional experience it is the best contribution we have had to the literature on the stomach disorders of cows. That does not mean to say that I agree with all he does say, but, unlike the previous speaker, Mr. Wright, I would prefer Mr. Begg's ideas to those of Mr. Davies.

There are some points on which I am at variance with Mr. Begg: one is that he is inclined to the view that all stomach disorders in cattle are of a secondary nature. I think that is going a little bit too far, and he has got a little bit too enthusiastic when he goes to that length, because with such a complex digestive apparatus as that of the cow, we do get a considerable number of primary conditions. In a district like his, where cattle are stall-fed for so many months of the year, I should have thought he would get more than we do. Unlike him, I favour the use of laxatives in certain conditions, and I am very surprised that, staunch user of the stomach pump as he used to be, he has not mentioned the use of the stomach tube which is common in the practice of many practitioners.

In all these cases of secondary indigestion it is most essential that the bowels be kept moving, otherwise the condition deteriorates very considerably.

Referring to endocarditis, we have come across a few cases of sudden death in the last few years where there has been no traumatic origin at all. The cases were cows found dead quite suddenly, and the only condition exhibited on *post-mortem* examination has been acute endocarditis. It happens on one or two farms, but it is not widespread. It is like the condition we get in pigs at times, where the only symptom is acute endocarditis—and which may be a forerunner of erysipelas. I wonder if there is any connection between that and the heart attack.

If one finds chronic tympany in a tuberculin tested or attested herd, then one can reasonably diagnose that this is a case of actinobacillosis of the stomach. Like the previous speaker, I use a good deal of sulphamezathine, and find we get better results, and the injection is given much more easily.

Coming to bloat, I had a number of cases ten days ago; I was called late in the evening to an outbreak where about ten cattle were affected, and I got there actually within an hour of the cattle being turned out of the cowshed. They had broken into a field that had been cleared of wheat and with the wheat there was considerable undergrowth of new grasses. When I arrived one animal was lying dead; the others were in a very distressed state

with acute tympany, belching food from the mouth. Puncture of the rumen gave no relief whatever. While the cow exhibiting the most acute symptoms was swinging on its feet 20 c.c. of anthisan was hurriedly injected intravenously and within five minutes that animal was perfectly normal. We went round all the others using anthisan; we did not use any controls because we dared not. We kept a close watch, and the longest one to recover took 12 minutes before it was back to normal; most were back within five minutes of being very acutely distressed. Whether we shall get that result in all cases of bloat I do not know; perhaps it was because the grasses were so very young. I can visualise in the next month or so we are going to have a good deal of bloat with the excess of rain and the consequent quick growth of under-sown grasses.

The Chairman: We only have another ten minutes, and Mr. Begg must have a chance to reply.

Mr. W. K. Carnegie (Brampton): I would like to congratulate Mr. Begg on his excellent paper, although I am not going to agree with him entirely on many of his points.

It seems there are two schools of thought regarding rumenal troubles: one for traumatic reticulitis, and the other for rumenal dysfunction.

We get quite a large proportion of the reticular troubles of traumatic origin, but we get a much greater proportion of troubles from ordinary dysfunction due to dietetic causes.

We do get grunting in cows with traumatic reticulitis, but I am rather inclined to examine the pleura before we get that far.

As regards bloat, I was interested in the last speaker's remarks, because last year we had a very acute outbreak in a herd. One or two cows were lost before we got there but anthisan was used and we had recovery in every case. Some had got to the recumbent stage and would have been dead in a few minutes. The time factor is important; they seem to become normal in about an hour.

With acute impaction and atonic rumen, I agree with Mr. Davies; I also agree that heavy purgation is unnecessary.

Traumatic reticulitis: Mr. Begg mentioned high fever, a temperature of 103°, and that you get complete cessation of rumenal movement. I question that. I think that the rumenal movement depends largely on the point of penetration of the foreign body. I have not had the practical experience he has had, but penetration in the fundus of the reticulum does cause immediate cessation of rumenal movement. Anywhere else, *e.g.*, near the oesophageal entrance, the fold between the rumen and the reticulum, I think stomach movement can go on for a day or two.

On the differential diagnosis of traumatic reticulitis, and the wooden appearance of the cow, I agree it is a characteristic, but we must be careful in this differential diagnosis, which is rather difficult to make. I have not got to the stage in practice of routine use of the blood count in differential diagnosis. I have heard it fully explained, but I think it probably takes more haematology than I have.

We have seen several cases of spasm of the lumbar muscles, and the cow certainly grunts in that condition.

I was rather surprised to hear Mr. Begg mention abomasitis. I have heard him on a previous occasion question whether there is such a condition.

With regard to the high fever, the treatment is, keep the cow under reasonably warm conditions, and do not use sulphanilamide.

Mr. Begg mentioned malignant catarrh, and that he has seen cases of acute enteritis in malignant catarrh. We get rather a lot of these, and I have never seen a case of abomasitis as an early complication of malignant catarrh. We treat this with quinine-sulphate, which is a good specific.

The Chairman: The general discussion is now closed, and I will call on Mr. Begg to reply.

The Reply

Mr. Hugh Begg: I would congratulate all the speakers, including the two openers. Very few people appear to agree with me, but I knew that would happen before I came. I know my cousin thinks I have "a bee in my bonnet."

I am glad to hear Mr. Morgan is in agreement with me with regard to the use of purgatives. Practically all our clients have been persuaded over the last 15 years to give up the use of purgative medicines in stomach disorders in cattle. I have purposely questioned about 200 of our clients and each one has admitted that he has not used a purgative in his herd for many years.

When a new client comes along I generally find he has been using Epsom-salt, large doses of treacle, and other purgatives, but within a month or two I manage to convince him of the futility of such treatment. As an interesting sidelight, I use about 4 lb. of magnesium sulphate per year and this is all given by injections in cases of lactation tetany or so-called staggers, but I have not given a cow salts, treacle, or other purgative medicine *per os* for many years.

Mr. Morgan's point regarding adhesions of the stomach to the liver, etc., is very interesting. Occasionally when I have performed rumenotomy for a foreign body and found none present, adhesions have been felt between the reticulum and other organs and those adhesions have been separated by lifting the wall of the reticulum from the inside. The cow has very often returned to health after this operation.

Rumination in Wire Cases.—Rumination is often absent in the very early stages, but we are not always called in very early. It is quite common for a cow to give 2 gallons of milk in the morning and in the evening only a pint or two; the temperature rises shortly after the wire penetrates to as high as 105° to 106°, but falls 24 hours later.

Mr. Morgan also mentioned endocarditis chiefly found on *post-mortem* examination. This may be the cause of a few of our undiagnosed fatal cases. I have one such case just now in which the pulse has been 120 for several months. This animal had a grunt and rumenotomy was ultimately resorted to, but there was no foreign body present.

With regard to acute tympany, Mr. Morgan mentions making a bold incision into the rumen, when large quantities of ingesta are forcibly ejected. We have saved many lives in this manner when the animal has been found *in extremis*. He seems to have confused my remarks on auto-intoxication and bloat. It has been my experience that the cow recumbent from auto-intoxication due to an accidental overfeed rarely recovers after this operation, whereas the cow recumbent with acute bloat generally does so.

With reference to the intravenous injection of sodium iodide in actinobacillosis, it seems that we have been very unfortunate in its use in our practice. When we first started using it some years ago we had quite a number of abortions in pregnant cows, and since then we have not treated a pregnant animal with it.

I have found both sulphanilamide and sulphamezathine useful in the treatment of actinobacillosis.

The probang was mentioned as an instrument useful in giving relief in cases of tympany. In my opinion it is a lethal weapon. I have seen a good number of animals killed by its use, and I do not possess one. In my very early days in practice I was advised by my father to throw it away.

I find myself at a loss to understand the tremendous difference between Mr. Davies's experiences and my own.

I agree with him particularly with regard to some of the causes of stomach troubles. I find a review of my experience shows 80 per cent. are traumatic in origin; the remainder are chiefly—bloat, accidental over-feeding and actinobacillosis.

He asked for my opinion on the effect of dietetic errors in stomach troubles. In my experience war-time rationing of concentrates for dairy cows has done a tremendous amount of good in educating farmers on the value of balanced feeding.

Before 1914 and between the two wars high protein concentrates were easily obtainable and very often fed in excessive quantity; the results were varying degrees of protein poisoning, very often proving fatal. It was quite a common occurrence for an owner to lose several cattle within a few days or even several in one day.

Poor quality fodder, in my opinion, does not so much cause stomach upset, but its food value is greatly reduced.

He mentions the use of the stomach tube in bloat. Its use does not give relief in frothy bloat but only when free gas is present. Even the trocar and cannula are of little use in frothy bloat, but they do allow the easy administration of anti-tympanitics into the rumen.

Traumatic Reticulitis.—In my opinion, a foreign body may penetrate the pericardium within 24 hours of being swallowed, or it may not do so for some months.

With regard to the cow which recovers without an operation for the removal of a foreign body, in only a very small proportion of cases is it assumed that the wire, after penetration, has fallen back into the stomach. In most of the other cases it persists and is ultimately surrounded by fibrous tissue and may even disintegrate in time. If recovery is only temporary it indicates the formation of abscesses or penetration of other organs.

Raising the Fore part of the Cow.—So far as I am aware, Imrie of Glasgow was the first person in this country to adopt this treatment. I have seen it practised since 1919. I cannot but agree that raising the front of the cow 10 inches to 12 inches does give almost immediate relief. At the same time, experience of rumenotomy in such cases shows that there is little tendency for the procedure to make the object fall back into the stomach.

My opinion was asked regarding pleurisy in the cow. This must be a very rare condition in my practice, and when it does occur a foreign body is generally involved.

I am glad to hear that Mr. Ingram agrees with my paper in

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general. Quite a number of cows eat their foetal membranes. Some do so with impunity; others die through choking and others through putrefaction of the membranes in the digestive tract.

I have knowledge of a number of sudden deaths every year due to heart penetration by a foreign body. He prefers the term protein-shock to auto-intoxication.

In displacement of the abomasum there is generally also torsion of the organ.

Mr. Wright thinks the operation for the removal of foreign bodies is being done by some too frequently. If the diagnosis is correct and the operation is a success, I do not think it can be done too often.

Mr. George Begg's experiences with the use of anthisan are very interesting, but unfortunately, up till now, it has had no apparent effect in my practice.

Mr. Carnegie asks regarding the temperature in traumatic reticulitis, and also if there is cessation of rumenal movement. The temperature rises to 104° or 105°, and movement ceases during the first 24 hours after penetration.

I am sorry, gentlemen, that this discussion and my replies have to be cut short, as I am quite sure the discussion could have been continued for some time yet, but we have already overstepped our time limit.

I wish to thank and congratulate Mr. Morgan and Mr. Davies for their part in opening the discussion, and I also wish to thank those others who have taken part in the discussion.

Declaring the session closed, the CHAIRMAN, on behalf of the members, expressed great appreciation of the contributions made by the essayist, the openers of the discussion and subsequent participants.

TRAINING BRITISH HORSEMEN FOR THE OLYMPICS

The British Horse Society announces the appointment of Captain Tony Collings as trainer and manager of the British team for the Olympic three days' test at Helsinki in 1952. Porlock has been chosen as the training centre. Captain Collings won the Badminton three days' event in April this year. The period of preparation will last over 18 months, and one team at least will be entered officially for the team section of the Badminton test to be held next April.

"The enterprise cannot be other than costly," observes *The Times*, "even though owners of likely horses are making these available through commendable self-sacrifice; and the Olympic Equestrian Fund, to which the King and Princess Margaret have already made substantial contribution, needs strengthening."

* * * * *

COLLEGE OF FOOD TECHNOLOGY

After negotiations between the Ministry of Education, the Ministry of Food, and representatives of various sections of the food industry it has been decided to establish a National College of Food Technology in London about September next year. A board of governors has recently been appointed by the Minister of Education on the nomination of the interests concerned. Mr. Frank Shires, of the Food Manufacturers' Federation, has been appointed Chairman of the board of governors and Dr. John Hammond, F.R.S., of the School of Agriculture, Cambridge University, Vice-chairman.

The college will provide the different sections of the food industry with training at a high level. This will include the handling, preservation, and processing of meat, fish, and other foods, together with their various derivatives and by-products; it will also deal with those branches of science most closely concerned with changes which take place in food during preservation and processing. The college will be housed within the premises of the Smithfield Technical College and some adapted premises near by, but plans are being prepared to provide new premises soon.

The students will attend on a full-time basis, and as a good foundation of science, coupled with industrial experience, is needed they will be drawn from industry at a comparatively late age, usually at 23 or over.

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WEEKLY WISDOM

It was the man in the street who must decide if we should have cities without noise. He must get it into his head that making a noise that was not necessary was a form of bad manners.—LORD HORDER, addressing the Royal Society of Arts.

TUBERCULOSIS-LIKE LESIONS IN THE PIG

BY

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A lesion resembling that of tuberculosis in the submaxillary lymph nodes of the pig was first investigated in 1938 by two Norwegian workers, Holth and Amundsen.[5] They described the associated organism as a Gram-positive, pleomorphic, partly acid-fast "coccobacillus," a conclusion that was confirmed in 1938 by Plum, of Denmark,[9, 10] who called his non-acid-fast coccobacillus the "Holth bacillus." Bendixen and Jepsen, of Denmark,[1, 2] in 1938, also described Gram-positive coccobacilli, which they considered to be identical with the organism incriminated by Magnusson as causing a specific infection in foals. In 1940, Magnusson himself[6] confirmed this conclusion after studying a series of lesions in the porcine cervical lymph nodes. In the same year, two German authors, Meyn and Müller,[7] examined the submaxillary lymph nodes of a number of pigs slaughtered in the Leipzig abattoir. A corynebacterium identical with Magnusson's *C. equi* was stated by them to be the cause of pseudo-tuberculous lesions. These findings were again confirmed by Hemmert-Halswick and Pescatore.[3] In 1949, Tundermann[11] investigated four cases in which tuberculosis-like lesions were present in the submaxillary lymph nodes, and described as the causal agent, a diphtheroid which was very similar to Magnusson's *Corynebacterium equi* though not quite identical.

Regarding the frequency of the condition, Hemmert-Halswick and Pescatore[3] concluded that 8·3 per cent. of all tuberculosis-like lesions in the submaxillary lymph nodes of the pig were associated with a pure corynebacterial infection. Müller[8] put the figure at 29 per cent., while several Danish bacon plants reported as many as 50 per cent.[3] Whereas, according to Meyn and Müller, working in Germany, the corynebacterial lesions of the pig are of little or no importance in meat inspection, Denmark, on the contrary, regards them as being of significance, since the flesh of all pigs thus affected is unfit for export to Britain.

It had been observed in Kenya for some years that a comparatively large number of baconers had tuberculosis-like lesions in the submaxillary lymph nodes. While, in occasional cases, acid-alcohol-fast bacilli were found in smears, the majority of these lesions showed no such organisms, and were non-pathogenic in laboratory animals.

The following preliminary investigation was carried out partly on the premises of Messrs. Uplands Bacon Factory (Kenya), Ltd., and partly at the Research Laboratory of the Department of Veterinary Services, at Kabete. Its objects were to determine the causation of these lesions, to work out a means of controlling the condition in the field, and to decide on the course to be taken by the meat inspector in interpreting lesions of this type.

To establish the position occupied by the "pseudo"-tuberculous lesions in relation to the other abscesses encountered, the series examined was made to include all types of abscess, taken (for statistical purposes) in the order in which they were found. While considerable variety was observed in the characters of the abscesses, it was soon apparent that for bacteriological purposes it was worth while to recognise three main groups:—

1. A "creamy" type, in which the pus is fluid enough

to run from the incised lesion on the application of slight pressure.

2. A " cheesy " type, in which the pus is solid or semi-solid, but still capable of expression through an incision in the abscess by strong pressure (*i.e.*, from " tooth-paste " to caseous consistency).

3. A " dry " type, in which, after cutting the lesion across, the contents may be expressed as a firm " pea," usually friable.

All of the third group had the appearance of the tuberculous lesion, while in the second group there was a transition from the caseous lesion of tuberculous type to the less fluid type of " pyogenic " lesion.

Gram-stained smears and serum-broth cultures were made as a routine from all abscesses, Ziehl-Neelsen smears from all those that bore any resemblance to a tuberculous lesion. As the object of the investigation was the " pseudo "-tuberculous rather than the frankly tuberculous lesion, the acid-fast organisms encountered were not submitted to pathological or cultural examination.

Results

Abscesses of various types were to be found all over the carcases, the most common sites being the prescapular and mesenteric lymph nodes, the subcutaneous tissues and the abdominal cavity. A tendency towards generalisation was noted, especially in older pigs, but no loss of condition or other appreciable ill-effect was observed. The lesions varied greatly in size, as whilst most of them were below ¾ inch across, larger specimens weighing as much as 48 lb. were not uncommonly encountered.

The setting quality of the carcases was, on the whole, quite satisfactory, except in cases where generalisation or pyaemia was present. The latter appeared to result from mechanical rupture of a thin-walled purulent lesion in the course of the long journey from the farm to the bacon plant, a view which was confirmed when enquiries disclosed that prior to shipment nothing untoward in either the behaviour or the appetite of the affected pigs had been noted.

The percentage of animals found in the course of routine meat inspection to have tuberculosis-like lesions was fairly high, often reaching anything up to 20 per cent. of a day's killing. The highest figures were recorded during the long drought, a substantial decrease being noted after the rains had set in and the temperature had become cooler.

Whilst from macroscopical examination of the lesions differential diagnosis is extremely difficult, or even impossible, stained smears are usually found to contain the causal organism. The following bacterial types were found in this way: acid-alcohol-fast bacilli; Gram-positive pleomorphic coccoid or club-shaped forms, sometimes rod-like or with pointed ends; chains of cocci; bipolar organisms; and short, rather stout Gram-negative rods. About 10 per cent. of all lesions, and most of the abscesses over 1½ inches across appeared to be sterile.

The distribution of the various pathogenic bacteria according to the morphology of the lesions was as follows:—

1. *Lesions Containing Acid-alcohol-fast Organisms.*

Fourteen per cent. all abscesses in the series contained typical acid-alcohol-fast bacilli. As, however, this reflects only the number of positive smears, and as a number of the dry abscesses were sterile in serum broth, the actual percentage of " tuberculous " lesions was doubtless higher. Fifty per cent. of the dry abscesses contained acid-alcohol-fasts, but only 12 per cent. of the " cheesy " type. However, as the cheesy abscesses were much more common than the dry type, they actually provided almost half of the positive smears. One creamy subcutaneous abscess was found to contain acid-alcohol-fast organisms. Six out of seven of the " tuberculous " lesions were found in the submaxillary lymph nodes, and 90 per cent. of them were below ¾ inch across. Twenty-seven per cent. of the " tuberculous " lesions showed no other organism demonstrable by our methods, 20 per cent. contained beta-haemolytic streptococci, and 40 per cent. *B. coli.*

2. *Corynebacterial Lesions.*

More than a third of the abscesses contained diphtheroids, three out of four of which were *C. pyogenes*, showing the following details. The growth on plain agar was very poor, on serum agar slightly raised streptococcus-like colonies developed. Solidified serum was slowly liquefied. Indol was not fermented. Acid but not gas was produced from glucose and lactose. The remainder appeared to be an atypical *Corynebacterium equi*, showing all details with regard to morphology and staining characteristics, such as profuse viscid growth, but no production of a red pigment. Carbohydrates were not fermented. This atypical strain will be investigated further. *C. ovis* was never found. Two-thirds of the corynebacterial abscesses were creamy, and the rest cheesy. Just over half of them had a greenish tinge. Slightly less than half contained other organisms, these being streptococci, coliforms and bipolars, but not acid-fasts.

3. *Streptococcal Lesions*

Almost a third of the lesions contained beta-haemolytic streptococci, 90 per cent. of these abscesses being of the creamy or cheesy type. In 38 per cent. of cases the streptococcus was in pure culture, in 45 per cent. there were acid-fasts also, and in 24 per cent. corynebacteria. The remainder contained coliform and, less commonly, bipolar organisms.

Histology

" Caseous and calcified nodules with slight encapsulation are visible. Adjoining these are numbers of small cellular tubercles, occurring singly or in small groups. These lesions resemble morphologically those produced by tuberculous infection in the pig. Sections stained by Ziehl-Neelsen showed small numbers of acid-fast organisms resembling tubercle bacilli present in the peripheral areas of the lesions, together with some particulate acid-fast debris which may represent disintegrating organisms.

" The other type of lesion appears as a chronic abscess without any characteristic features, although showing some similarity to corynebacterium infection. Sections stained Gram show numerous small Gram-positive pleomorphic organisms scattered through the purulent material centrally."

Discussion

A series of lesions, some resembling tuberculous foci, and situated in the lymph nodes, skin, muscles and organs of 50 pigs (mostly baconers, but with a few boars and sows) were examined. Although in many of the " pseudo "-tuberculous lesions acid-alcohol-fast organisms could not be demonstrated, their appearance simulated that of tuberculosis so closely that it was impossible to reach a differential diagnosis during routine meat inspection. Bacteriological examination revealed corynebacteria (mainly *C. pyogenes*) in a third of all lesions, beta-haemolytic streptococci in just under a third, acid-alcohol-fast organisms and *B. coli* in about a sixth each, and bipolar organisms in a quarter. Half of the coryne-

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bacterial isolations, 38 per cent. of the streptococcal, and 27 per cent. of the acid-alcohol-fasts were in pure culture. Any two of the bacterial species were to be found together, with the consistent exception of the diphtheroids and the acid-fasts. A detail of interest was that 20 per cent. of the streptococcal isolations were from "tuberculous" abscesses, the streptococci being found viable even in completely dry lesions. Further research would be required to find out which organism was the primary invader. The part played by the haemolytic streptococci is of special interest since Holz's[4] recent publication has revealed the noxious influence of streptococcal infection on the pig population of Northern Germany. It was a matter of surprise that *C. ovis* was never recovered from these abscesses, especially in view of the prevalence of this organism in caseous lesions of sheep and in ulcerative lymphangitis of horses, conditions which are common in Kenya. The position of the bipolar organisms in the tuberculosis-like lesions also requires further investigation. Only a quarter of the isolated strains were pathogenic to mice, although more than half of them were found in pure culture. The coliform organisms were found most often in the mesenteric lymph nodes.

In the course of the investigation, certain points were observed which may help towards a tentative diagnosis in the abattoir. The dry, as distinct from caseous abscesses never contained corynebacteria, and in 50 per cent. of cases did contain acid-fasts demonstrable by ordinary smear-examination. Caseation, on the other hand, was of no diagnostic significance. A creamy consistency of the pus indicated the presence of either corynebacteria or beta-haemolytic streptococci in nearly all cases, corynebacteria being slightly more frequent. A greenish tinge in the pus pointed to corynebacteria.

While earlier reports of "pseudo"-tuberculous lesions in the pig have placed them in the submaxillary lymph nodes, most of those in our series have been in the prescapular nodes, though a substantial number were submaxillary.

A point of interest which requires further confirmation was the absence of bone lesions and the rarity of calcification in those containing acid-alcohol-fast organisms.

The location of the cervical lesions, especially those in the prescapular nodes, makes it difficult to detect them in the course of routine meat inspection, all the more since the submaxillary nodes often give no clue as to the existence of prescapular lesions.

In carcases intended for immediate curing, the detection of the lesions is facilitated greatly by the Wiltshire method of trimming, as this exposes the prescapular lymph nodes adequately, and opens up a wide field in the pelvic and abdominal cavities. In carcases intended for export in the frozen state, on the other hand, the examination becomes more complicated, as only the head is removed, and the prescapular lymph nodes remain well hidden. A routine incision from the inside of the neck is, of course, possible, but mutilates the side to some extent and is therefore not welcomed by the meat industry. As an alternative, careful palpation of each neck has been incorporated in the routine examination of the carcase, incision from the inside to open up the prescapular nodes being undertaken when any suspicion is aroused on palpation. This method has proved helpful, but lesions which are very small or which are embedded in thick layers of fat or muscle may sometimes escape detection.

Although the localised nature of the lesions necessitates no more than the removal of the affected parts, the condition is still one of economic importance to a country interested in the export of meat, as each carcase thus affected has to be retained and diverted to the home market, because only pigs of first-class quality and free from any blemish or disease are passed for export.

To reduce the incidence of these infections as far as possible, every effort is being made to educate pig producers in the importance of sound management, especially as regards housing, sanitation and the immediate treatment of all injuries, since in a tropical climate even the smallest injury may give rise to an abscess if neglected.

Summary

1. The following tables give the bacteriological features:—

Table showing the Correlation between the Type and Situation of the Abscesses and the Organisms Found

	Percentage of each type containing the various organisms					
Type of abscess	Diphtheroids	Streptococci	Bipolars	Acid-al.-fasts	Coliforms	Sterile
All types ...	34	30	24	14	10	10
Subcutaneous	42	28	28	7	0	21
Lymph nodes	29	26	23	21	14	8
Greenish pus	42	14	14	0	0	28
Greyish-white pus	16	32	23	21	13	5
Creamy lymph node abscesses	56	42	14	0	0	0
Cheesy lymph node abscesses	30	24	30	12	18	12
Dry lymph node abscesses	0	12	25	50	25	12
Below ¾ in.	22	26	22	31	13	13
¾ in. to 1½ in.	24	17	17	9	9	9
Above 1½ in.	0	0	0	0	33	67

Percentage of Each Bacteriological Type of Abscess Possessing the Various Characters

Bacterial content of the abscess	Creamy	Cheesy	Dry	Below ¾ in.	¾ in. to 1½ in.	Above 1½ in.
Diphtheroids	60	40	0	55	45	0
Streptococci	45	45	10	73	27	0
Bipolars	45	35	20	70	30	0
Acid-alcohol-fasts	14	43	43	87	13	0
Coliforms	25	50	25	60	20	20
Sterile	50	50	0	50	18	32

2. "Pseudo"-tuberculous lesions are found most commonly in the cervical lymph nodes, particularly the prescapular.

3. Differential diagnosis of the lesions is difficult by macroscopic examination alone. Advantage may, however, be taken of the observation that corynebacteria were never found in dry lesions, these being predominantly of "tuberculous" origin; that a creamy consistency indicates corynebacteria or streptococci; that lesions of a greenish tint are never found to contain acid-alcohol-fast organisms, and that the prescapular lymph nodes are primarily infected by corynebacteria and streptococci, and

(*Concluded at foot of next page*)

ELECTROCUTION OF UNWANTED DOGS AND CATS*

BY

MAJOR C. W. HUME,

DIRECTOR, UNIVERSITIES FEDERATION FOR ANIMAL WELFARE

Use of electrocution cabinets.—Several animal-protection societies are making large and increasing use of electrocution cabinets for dogs and, in some cases, cats. On the other hand, the Scottish S.P.C.A. and Ulster S.P.C.A. have refused to use these cabinets until the requisite practical conditions for humaneness have been ascertained. UFAW has long sought an opportunity of making the requisite measurements, but only very recently has it been able to find a user who consents to this course.

Possibility of inflicting intense pain during electrocution.—To ask "Is electrocution humane or cruel?" is like asking "Is strychnine a tonic or a poison?" One-sixtieth of a grain of strychnine is a tonic dose for a man; 1 grain is fatal. A current of 400 milliamperes (ma.) down the body of a medium-sized dog may, subject to a reservation to be mentioned later, produce unconsciousness within a few seconds; a current of 50 ma. will cause intense pain, which will continue until the animal either swoons or is asphyxiated, although the process will appear to an onlooker to be perfectly humane because the animal is incapable of struggling or screaming on account of the tetanisation of all its muscles. It is impossible to say what values of current are actually attained, because there appears to be no reliable authority for the various figures which are quoted.

It will be clear from what follows that mere clinical observation, however expert, is of little value unless it takes account of the variation of individual susceptibility (which can be estimated from the work of Ferris and others), the variation in mains voltage with changes of load (usually within 10 per cent. of the nominal mains voltage), and the ohmic resistance of the animals (which has never been measured and probably has a very large variance).

There is a further question which throws some doubt on the humaneness of any instrument which passes a current through the body and excludes the head. As will be seen presently, this doubt arises from uncertainty as to how long consciousness endures after the circulation of the blood has ceased. Normally this interval would seem to be very brief, say, two or three seconds; but in cases of heart block it has been known to be appreciably longer, say ten seconds or even more. The pain caused by electric cramp is so severe that even this brief infliction of it should be avoided if possible, and it may well be that electrocution through the body will eventually have to be abandoned in favour of electrocution through the head.

The causes of death in electric accidents.—These have been very fully investigated in the U.S.A. by a series of investigators such as Kouywenhoven, Langworthy, Ferris and co-workers, and Conrad and Haggard. We may leave out of account two possible causes of death, *viz.*, burning and arrest of the heart, for these occur only with currents much larger than those which the cabinet can produce. We may also leave out of account all wave-forms except 50-cycle alternating current, which is ordinarily used; but we shall accept data obtained with 60-cycle current, since small differences of frequency have little effect in that neighbourhood.

There remain only two possible causes of death, *viz.*, asphyxiation due to arrest of the lungs, and heart failure due to the onset of ventricular fibrillation. Fibrillation stops the circulation of the blood and is followed by unconciousness after a brief interval. More information as to the length of that interval is desirable.

We may say, then, that electrocution is extremely cruel unless the current is strong enough to produce ventricular fibrillation promptly. When an animal is taken out of the cabinet in an inert and relaxed condition but with its heart still beating, it must be assumed to have swooned from pain shock and to die subsequently from asphyxiation. If, however, the heart is in ventricular fibrillation, we shall wish to know what time elapsed before the onset of this condition.

It is to be noted that in the smaller animals, from cats downwards, the heart may automatically recover after fibrillation has been started, but in the larger animals, from dogs upwards, fibrillation normally persists until death ensues.

Effect of current strength.—In human beings a current of about 1 ma. can just be felt; a current of about 15 ma. or more deprives the subject of control over his muscles; and as the current increases above that value the pain caused becomes increasingly intolerable. These data relate to alternating current from the mains.

With currents passing down the body but not through the head arrest of breathing was found by Conrad and Haggard to occur in rats after a time depending on the strength of the current. It can be deduced from their diagrams that roughly the time required is inversely proportional to the four-fifths power of the current. The time required to induce ventricular fibrillation, on the other hand, is found in the same way to be inversely proportional to the square of the current. With a current greater than about 1·5 amperes, fibrillation occurs in rats before

* Commentatory notes, reviewing existing knowledge, and preparatory to an investigation of the problem at Cardiff and elsewhere.

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the submaxillary and mesenteric nodes by the acid-alcohol-fasts.

Acknowledgments.—We have much pleasure in thanking the Director of Veterinary Services, Kenya, for permission to publish this report of our investigation, Dr. H. S. Purchase, C.V.R.O., Kenya, for his constant interest, Mr. J. S. Beattie, Senior Lecturer in Charge of the Department of Pathology, R.(D.)V.C., Edinburgh, for the confirmation of the histological sections, and Mr. J. H. Southall, General Manager, "Uplands Bacon Factory (Kenya), Ltd.," for his co-operation and assistance both in the factory and in the field.

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arrest of breathing, and with a current less than that value arrest of breathing occurs before fibrillation. For instance, with a current of 400 ma. breathing stops after five and a half seconds and fibrillation occurs after 32 seconds. These figures apply to rats and cannot be directly applied to dogs and cats; the current required in small species is disproportionately strong. The same general principle appears to hold, however, for all animals, including man; with relatively strong currents fibrillation occurs before arrest of breathing, and with relatively weak currents the contrary is true.

Current-strength through the body requisite for prompt fibrillation.—Ferris, King, Spence and Williams determined the minimum 60-cycle current passing from right foreleg to left hind leg which would produce ventricular fibrillation within three seconds in various species of animals. With weaker currents a longer application will be needed, and if we extrapolate from Conrad and Haggard's results for rats (a very uncertain procedure, but the best guess at present available) we may say that by halving Ferris's value of the current we shall prolong the delay to nine seconds, and by reducing the current to one-third we shall prolong the delay to 27 seconds. These figures are averages, and subject to statistical variation; and they are extrapolated from the measurements on rats, and therefore in the nature of a guess.

For ten dogs with an average weight of 22 kg. (48½ lb.) the average current required to produce ventricular fibrillation within three seconds was found to be 110 ma., with a range of 150 ma. If, as a rough approximation, we use the probability tables based on normal or Gaussian distribution, this range corresponds to a standard deviation of 47·6 ma., and from a table of Student's t we can estimate what percentage of dogs will fail to reach ventricular fibrillation within three seconds at various current-strengths.

Similar calculations could be made for cats, but as normal circulation may be resumed automatically in the cat, the method is unsuitable for these animals in any case.

Resistance of dog (ohms)	Current (ma.) from right foreleg to left hind leg of dog, if open-circuit voltage is 1,800 and effective secondary ballast resistance is 5,000 ohms	Estimated proportion of dogs which fail to fibrillate within three seconds
31,000	50	83 per cent.
13,000	100	58 ,,
11,300	110	50 ,,
7,000	150	21 ,,
4,000	200	4½ ,,
1,000	300	3 per thousand.

Factors affecting the current.—The current through the dog is equal (if we may neglect the leakage inductance of the transformer) to the open-circuit voltage in the secondary circuit divided by the total resistance in that circuit.

The open-circuit voltage is said to be usually 2,000 (in old cabinets 1,000) when the mains voltage is at its nominal value. If the mains voltage fluctuates from, say, 230 to 207 volts in the course of the day, the open-circuit voltage will drop to 1,800 and the current will drop accordingly.

The resistance in the secondary circuit is made up partly of a constant resistance (reflected from a ballast resistance in the primary circuit) and the resistance of the dog measured between a shackle on the leg and a collar on the neck. In one case the primary resistance is said to be 70 ohms and appears to be reflected as a few thousand ohms in the secondary. I have assumed 5,000 ohms by way of example.

No reliable measurements of the working current or the resistance of the dogs appear ever to have been made; certainly not on a sample of adequate size. The figures sometimes quoted appear to be the result of guesswork.

The resistance of an animal resides mainly in the skin, or at the contact between electrodes and body, and is extremely variable. In the case of students at the London Hospital the resistance from hand to hand was found to vary between 100 and 10,000 ohms. It may be assumed that the resistance changes during the passage of the current, being initially high but smaller after current has begun to flow.

Measurements required.—All the data requisite for prescribing the requirements for producing ventricular fibrillation within three seconds are available, except the mean and variance of the resistance of the animals, measured between collar and shackle. A duplex recording instrument is in hand, for recording voltage across the animal and current through it; from these data in a sufficiently large sample the desired mean and variance can be calculated. A recording instrument is necessary on account of the variation of resistance with time. Dr. Phyllis Croft, B.SC., PH.D., M.R.C.V.S., UFAW Research Fellow at the Neuropsychiatric Research Centre, Cardiff, is engaged upon the problem of electrocution among others.

There remain the question how long consciousness can endure after ventricular fibrillation has set in, and the fact that cats can recover automatically from ventricular fibrillation.

The investigation should make it possible to say whether or not electrocution through the body alone ought to be abandoned and replaced by electrocution through the head, as in Holland. Electrodes would have to be suitably designed and an adequate amperage must be passed through the cerebrum for a sufficiently long time. Measurements relating to the last-mentioned two points would be required.

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Chemists in South Africa are being urged to cater for the veterinary supply business and try to capture the big volume of trade that that country's prosperous farming communities bring to farmers' co-operatives, general dealers, and dairy supply houses. These dealers may sell any poison or therapeutic substance if it is marketed in veterinary packings and is not for human use. Such conditions result in large quantities of potent drugs passing through unqualified hands and being used freely by farmers for human ailments as well. In an editorial the *South African Pharmaceutical Journal* remarks that chemists are logically the avenue of distributon for veterinary medicines and they are best trained to guide and assist the farmer. Recently the Registrar of Veterinarians drew attention to the illegality of the use of the term "Veterinary Chemist" and chemists were cautioned to refrain from describing themselves in such a manner.—*Pharm. J.*

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I.C.I. Films.—It will be recalled that some admirable films from the I.C.I. film library formed an interesting feature of our Cardiff Congress. The new I.C.I. film catalogue, containing a complete syllabus of all films produced by the company, is now available and copies may be obtained from the film library at Bolton House, Curzon Street, London, W.1. The films may be borrowed free of charge.

TRANSMISSION OF TUBERCULOSIS TO CHICKS THROUGH EGGS OF TUBERCULOUS HENS

BY

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Among the possible sources of infection of chicks by avian tuberculosis are the eggs of tuberculous hens.

The eggs used in this work were from five artificially infected hens. The hens reacted positively to avian tuberculin one week after infection. They died four and a half to five months after infection, were immediately autopsied, and were all found to be infected.

The collection of eggs began immediately after the tuberculin test became positive. Twenty eggs were collected 35 to 45 days after infection and 19 eggs were collected 66 to 80 days after infection. Both batches of eggs were incubated with equal numbers of fertile eggs laid by healthy hens as control for normal hatchability.

Nine living chicks were hatched from the first batch of 20 eggs from the infected hens (45 per cent. hatch), six dead germs and five dead chicks were obtained from the eleven unhatched eggs. The 20 control eggs yielded 12 living chicks (60 per cent. hatchability). Six dead germs and two dead chicks were obtained from the eight unhatched eggs. From the second batch of eggs from the infected hens, eight living chicks were hatched (42·1 per cent. hatchability). Five dead germs and six dead chicks were obtained from the eleven unhatched eggs. The 19 control eggs yielded 12 living chicks (hatchability 63·2 per cent.). Four dead germs and three dead chicks were obtained from the seven unhatched eggs.

The hatched chicks were kept on uninfected ground. Five chicks from the first batch and three from the second died within one month, while the remaining nine chicks were killed when three months old. All chicks were autopsied, but none was tuberculous, nor could tubercle bacilli be demonstrated microscopically or culturally.

Acknowledgment.—The writer wishes to thank Professor A. M. Wahby for his help in preparing this work.

*ISO*PROPYL ALCOHOL IN COWS SUFFERING FROM ACETONAEMIA

Alex. Robertson, Christian Thin and Ann M. Stirling, of the Department of Veterinary Hygiene and Preventive Medicine, Royal (Dick) Veterinary College, writing in the December 2nd issue of *Nature*, record the finding of considerable amounts of *iso*propyl alcohol in the blood, milk and rumen contents of cows suffering from acetonaemia, "whereas there appears to be none present in normal animals. This means that the figures given hitherto for β-hydroxybutyric acid in the literature on that condition are probably misleading, as by most of the usual methods of analysis *iso*propyl alcohol would be estimated with that fraction. Moreover, in view of its close relationship to acetone, *iso*propyl alcohol might be either a precursor or a metabolic product of that substance. If the former is the case, it would necessitate an entirely new approach to the problem of the development of ketone bodies in this disease."

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M. M. Boussac, French racehorse owner and breeder, has made a gift of £1,000 to the Animal Health Trust for their Equine Research Fund.

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A Bill to make veterinary work a state monopoly was approved —without opposition—by the Czech Cabinet, states *The Daily Graphic*, in its issue of December 6th.

CLINICAL COMMUNICATIONS

ULCERATIVE STOMATITIS IN AN ELEPHANT, SUSPECTED TO HAVE BEEN CAUSED BY ACETIC ACID

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Subject.—An adult female elephant on an estate near Colombo.

History.—Dysphagia of sudden onset; one morning it was noticed that the animal could not drink water or swallow food. She was eager to drink and eat, but when she ladled water into her mouth it gushed out. Similarly when grass and leaves were chewed, the food dropped out of the mouth.

Signs and Lesions.—Temperature was 98° F., which is very slightly higher than normal. On the buccal mucosa and palate there were several shallow ulcers about 1 inch in diameter with soft yellowish deposit and inflamed edges. The soft palate appeared to be swollen, but it was impossible to examine the throat as the animal curled her tongue back when this was attempted. Some of the deposit on the ulcers was scraped into test tubes and some saliva collected.

The saliva was strained through glass wool and inoculated intradermally into the plantar pads of the hind feet of four guinea-pigs; this test was made as the attendants stated that the buffaloes on the estate were suffering from foot-and-mouth disease. It may be mentioned here that Ferrier (1947) states that he has not seen foot-and-mouth disease in elephants in Burma, although it is common in cattle there.

Some urine and faeces were collected; blood films were made and wet blood preparations were examined at once.

Microscopic Examination.—Films of the deposit on the ulcers stained by Gram's method revealed profuse flora of bacteria, mostly streptococci.

Films of the blood, stained and unstained, did not disclose any evidence of protozoa or of microfilaria.

Chemical Examination of Urine.—Negative for albumen, blood, bile and bile salts. Microscopic examination of the faeces disclosed numerous nematode ova.

Biological Examination of Saliva.—The injected pads of the guinea-pigs became swollen within 48 hours, but this was found to be due to pus containing numerous streptococci.

Diagnosis.—Ulcerative stomatitis and pharyngitis, probably caused by streptococci; there was a suspicion that the elephant had been maliciously poisoned with acetic acid which is easily obtained, as it is used in the rubber factories. It is possible that strong acetic acid was given inside some fruit and that the ulcers resulted from the corrosive acid, followed by infection.

Treatment.—50 c.c. of 5 per cent. solution of Anthisan (May and Baker), an antihistamine drug, was injected subcutaneously. An electuary composed of jaggery treacle, 50 grammes of sulphamethazine I.C.I. (Pharmaceuticals) and about 1 lb. of potassium chlorate was administered. At the request of the manager of the estate, penicillin 900,000 units was injected intramuscularly.

Within 18 hours the animal was drinking and eating normally, the ulcers appeared to be healing.

Another dose of electuary containing 50 grammes of sulphamethazine was given and complete recovery ensued within a few days.

Remarks.—The use of Anthisan apparently relieved the dysphagia. The sulphamethazine, although given in a comparatively small dose, may have had a local effect on the infected mucous membrane of the mouth. Similarly, the penicillin, although in a comparatively small dose, may have had a curative effect.

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PRELIMINARY NOTE ON THE TREATMENT OF SPIROCERCOSIS IN DOGS WITH A PIPERAZINE COMPOUND, CARICIDE (LEDERLE)

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Infestation of dogs with the nematode *Spirocerca lupi* (*S. sanguinolenta*) is not uncommon in Ceylon. It was described by Linstow (1906) and was found in many dogs and jackals by Crawford (1935, 1936, 1937, 1938, 1939), formerly Chief Veterinary Officer in Ceylon. The writer has not had the opportunity of examining many live or dead dogs, but has found the lesions and parasites in three dogs and has seen five live dogs showing typical clinical signs. These included dysphagia, frequent vomiting and retching, accelerated pulse and respiration rates, tumultuous heart sounds, emphysema of the lungs, dullness and emaciation. The aneurysms and other lesions in the arteries may lead to secondary bacterial infection and acute fatal illness.

The object of this communication is to record the beneficial effects of 1-diethyl carbamyl-4-methyl piperazine dihydrogen citrate, issued by Lederle Laboratories Division, American Cyanamide Company, under the trade names of Hetrazan, 50 mg. tablets (used for the treatment of human beings affected with filariasis) and Caricide, 400 mg. tablets for the treatment of canine filariasis. Hitherto, no other drug appears to have been used successfully in the treatment of spirocercosis.

CASE 1. *Subject.*—Alsatian bitch, one and a half years. History of frequent vomiting and retching. She was in poor condition, rapid pulse and respiration rates, tumultuous heart sounds, temperature normal. Infested with hookworms. The dog was treated with tetrachlorethylene and improved to some degree, but vomiting, retching, accelerated respiration and pulse rates continued. A full brother of this bitch had died after an acute illness; the present writer was asked to make a *post-mortem* examination and found among other lesions two large nodules about ¾ inch in diameter in the wall of the oesophagus in the cardiac region containing several spirocercae; there was also an aneurysm in the posterior aorta. Both the dog and the bitch had been in the habit of catching and eating dung beetles, the intermediate host of *Spirocerca lupi*.

Through the kindness of Messrs. Millers, Colombo, agents for Messrs. Lederle, a supply of Hetrazan was available. The bitch was given ten tablets, *i.e.*, 500 mg. a day for ten days. At the end of this period she was greatly improved in health, vomiting and retching had ceased, appetite was good, pulse and respiration rates were almost normal. A supply of the drug in the form of Caricide was now available and administration of 500 mg. per day was continued for a furtner ten days. Tne bitch continued to improve and has maintained this improvement for over three months after beginning treatment.

CASE 2. *Subject.*—Irish Terrier dog, nine years. History of vomiting and retching, dysphagia and dullness. The temperature was normal, the pulse and respiration rates were very rapid, the thorax distended, and there were loud thumping heart sounds. The dog was very apathetic. Caricide in doses of 500 mg. a day was prescribed. After ten days there was amazing improvement in its condition. Appetite had returned, there was no difficulty in swallowing, vomiting and retching had ceased, the pulse and respiration rates were approaching the normal and the dog had regained its former lively disposition. The owner, delighted with the efficacy of the treatment, continued it for another three weeks and reported that the dog was maintaining its improved health.

CASE 3. *Subject.*—Cocker Spaniel dog, four years. History of persistent coughing, especially at night, retching and vomiting of viscous sputum, capricious appetite. This dog had a temperature of 104·5° F. and was found to be affected with piroplasmosis. Treatment for this latter infection was begun and, in addition, Caricide, 400 mg. *per os*, was given. For the first two days of treatment nausea and vomiting occurred even when the tablets were given after a light meal, but on the third day the drug was retained and after four days of treatment the persistent coughing ceased and appetite improved. The temperature dropped to 102·4° F., but unfortunately there was a recurrence of the piroplasmosis and the temperature rose again to 103·4° F. The administration of Caricide was discontinued until the treatment for piroplasmosis had proved effective, but has since been resumed with apparent maintenance of improved health.

CASE 4. *Subject.*—Dachshund bitch, four years. History of cough, particularly at night, occasional vomiting and retching, capricious appetite, dullness. The temperature was normal; the dog was very constipated, an enema was given and milk of magnesia administered. Caricide at the rate of 150 mg. a day was given for seven days. At the end of that time the owner reported that the cough had ceased, appetite had returned, the dog had regained its lively disposition and there had not been any vomiting and retching.

REMARKS.—It is always difficult and often impossible to establish a diagnosis of *Spirocerca lupi* infestation by the examination of faeces and vomitus; apparently the nodules in the oesophagus and stomach do not always communicate with the lumen of the alimentary tract, or it may be that the ova are discharged in very small numbers or only intermittently. Diagnosis must depend on the chemical signs and history of vomiting and retching. Moreover, there is usually the history that the dog is in the habit of eating dung beetles.

It should be mentioned that these dogs were examined for microfilaria and that none was affected. Filariasis of dogs, caused by *Dirofilari ripens*, is very common in Ceylon; the usual signs are lassitude, skin disorders, loss of condition. Caricide is being tested on a number of infected dogs with good results, but a prolonged course with heavy dosage appears to be necessary.

SUMMARY

Caricide (Hetrazan), in doses of approximately 10 mg. per lb. bodyweight, had a beneficial effect on four dogs with the clinical signs of *Spirocerca lupi* infestation.

A fifth case has been treated by a veterinary practitioner in Colombo. A Maltese terrier with a history of persistent vomiting and retching was given Caricide at the rate of 10 mg. per lb. bodyweight. After four days of treatment vomiting and retching ceased and the dog has greatly improved in health.

Acknowledgments.—It is a pleasure to acknowledge advice from Mr. M. Crawford, M.R.C.V.S., and the generous supply of Caricide from Lederle Laboratories Division, American Cyanamide Company, also the kind offices of Mr. W. Worsley, Manager of the Drug Department, Messrs. Millers, Colombo.

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ABSTRACTS

[Diethyl-P-Nitrophenylthiophosphate (E605): A Note on its Effect on the Cattle Tick (*Boophilus m. canestrini*). Legg, J. (1950.) *Austr. vet. J.* **26.** 9-10.]

The only reports on the use of E605 are contained in the B.I.O.S. report N.1808, which indicates the method of manufacture and mentions the fact that the chemical has been used in the control of certain plant and other pests.

Several samples were sent to Australia and have been applied to tick-infested cattle. All the samples were of the miscible oil type and contained emulsifying agents. The preparations were diluted with water and applied in spray form, using a stirrup pump.

No. 1 preparation, containing 20 per cent. E605 and diluted to 1 : 10,000, gave a 98 to 99 per cent. kill of ticks on five treated animals.

No. 2 preparation, containing 70 per cent. E605 and diluted as in preparation No. 1, gave an 80 per cent. kill in four animals. Two animals showed dermatitis after treatment.

No. 3 preparation—35 per cent. E605—was also tested on four animals and gave a relatively poor kill of ticks.

The varying results were due to the different emulsifying agents used.

Later a preparation of E605 containing 20 per cent. active principle prepared for use on animals was tested. It was tried at 1 : 10,000 (two animals), 1 : 15,000 (three animals) and 1 : 20,000 (three animals).

At the highest concentration the kill of ticks was close to 100 per cent.

At the second concentration the over-all kill was in the region of 98 per cent.

At the third concentration the kill was in the region of 95 per cent.

The outstanding feature of these early observations was the difference in lethal effects of the various preparations and secondly the low concentrations at which the last preparation could be used effectively.

[The phosphatic range of insecticides have not hitherto been considered suitable for animal application owing to the danger of toxicity.—*Abstractor.*]

G. C. B.

[Bacteriostatic Activity of Sulphadiazine as Affected by Procaine Penicillin. *N. Amer. Vet.* (1950.) **31.** 460.]

There is a possibility that the procaine in procaine penicillin could inhibit the action of a sulphonamide given simultaneously. The results of the present study show that the bacteriostatic activity of sulphadiazine in the serum of children receiving therapeutic doses of sulphadiazine is not affected by the administration of the presently available procaine penicillin when the latter is given in the usual therapeutic dosage.

J. F.

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[Technical Aspects of Trichomoniasis (Laboratory Diagnosis). Lamont, H. G. (1949.) Reprint XIIth International Dairy Congress: Sect. I: Subject 4: 548-554.]

This paper describes the methods used at Stormont Laboratory for the diagnosis of Trichomoniasis of cattle. Samples of mucus from the region of the *os uteri* of at least six cows in the herd are aspirated into sterile glass tubes approximately 45 cm. long and 0·8 cm. bore with rounded ends. The tubes are then plugged after removal, with a sterile plug. At the laboratory direct smears of mucus are examined for presence of the parasite, but where this fails, cultures are prepared in a nutrient medium incorporating penicillin to control growth of contaminating organisms. After incubation, films are prepared daily for three to four days and examined for the presence of trichomonads. Uterine "washings" frequently yield positive results where vaginal mucus has proved negative.

Details of a useful confirmatory agglutination test, as described by Robertson and Kerr, are given and the methods of interpretation are included. A negative result does not indicate freedom from infection but a positive finding indicates presence of recent infection; this test quickly fades, however, especially where the animal recovers from infection.

A further test, the Mucus Test, is described and depends upon the presence of an agglutinin in the vaginal discharges of infective animals. Agglutination does not appear to occur at oestrus so samples collected at this period need not be tested for agglutinins.

It is emphasised that a negative finding with any one of these methods does not indicate freedom from infection, but from the combined results diagnosis can usually be made.

The difficulties of diagnosis in the bull are discussed and mention made of the difficulty of declaring free from infection an animal which has mated known infected animals.

J. McK.

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[The Oestrogenic Interruption of Broodiness in the Fowl. Jaap, R. G., & Godfrey, E. F. (Ohio State University, Columbus, U.S.A.). (1950.) *J. Clin. Endocrinol.* **10.** 829.]

The efficacy of diethylstilboestrol in interrupting broodiness was tested upon 152 hens which became broody during their first laying year. A dose of 15 mg. dissolved in 1 ml. sesame oil injected subcutaneously at the site of the lateral breast apteria successfully interrupted broodiness in 28 out of 37 hens. Doubling this dosage resulted in discontinuance in 113 out of 115 hens. Though this latter dosage would appear to be extremely large, tests on duration of the oestrogenic stimulus by the capon feather test demonstrated a duration of only three to five days. The high oestrogen level induced by this single massive dosage appeared to produce a temporary hypophysectomy. [Obviously a more durable effect could have been obtained with stilboestrol implants, though it is questionable whether this would be desirable, as it might well interfere with future egg laying.—*Abstractor.*] J. T. E.

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NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY

A council meeting of the Society was held at Manchester on November 15th, 1950, with Mr. John Holroyd, F.R.C.V.S., presiding.

Defence Fund claims considered included the following:—

Case 33/50.—Death of 14 pigs out of 24 treated with 98 per cent. sodium fluoride for worming. Tried previously on wreckling weaners with no ill-effects. Farmer instructed on use of powder (white) and mixing from leaflet supplied by makers. Fluoride mixed in dry mash, 15 grammes per pig (weights 100 to 150 lb.) and 4 lb. meal per pig. Pigs fed in batches averaging eight. Discussion ensued on liability of all parties concerned. Fluoride had been supplied by makers at customer's risk. It was felt that insufficient notice had been taken of the warning, that it had not been passed on to farmer, that batches of eight were too large, as " boss " pigs may have got greater share of meal and drug, and that if farmer was negligent in use and mixing of powder, it was because of loose instructions. Apparent liability, extent to be decided. Attention drawn to article on use of sodium fluoride in *The Veterinary Record*, July 15th, 1950, page 404.

Case 6/50.—Purchase of horse for £285. Member's assistant gave sound certificate and aged it at seven years in September, 1948. In March, 1950, claimant aged it at eleven years, and claimed £100 for wrong ageing. Agreed age had no bearing on purchase price, that claimant's experience with horses should have revealed correct age to him at purchase, and agreed claim should be defended.

Case 17/50.—Non-pedigree racing greyhound in for removal of outside digit of left foreleg. Assistant removed inside digit of right foreleg in error. Acting on advice of his own solicitor, member had settled at £100 before consulting Society. Settlement was made contrary to Society's rules and member had accordingly accepted personal liability. Figure of £100 was excessive on known facts. *Ex-gratia* payment of £30 approved, representing admitted value of dog.

Case 21/50.—Greyhound dog treated for hernia. 20 c.c. nembutal administered. Dog died 41 hours later. Member questioned on excessive dosage and asked if antidote was given. Reply awaited.

Case 28/50.—Loss of Cocker Spaniel puppies (number unstated) after whelping 15 puppies in litter. Letter from owner's solicitors received by member. Case referred to Society's solicitors for appropriate defence action.

Case 32/50.—Unsecured attaché case containing dangerous drugs stolen from locked car. Police recovered case and prosecuted member for contravention of No. 5 (2) of the Dangerous Drugs Act, 1937. Agreed not a Defence Fund case, but that it should be reported as of special importance to all practitioners. Dangerous drugs must be in a locked container under the direct supervision of the owner.

Case 22/50.—Death of three T.T. heifers out of ten inoculated against blackleg. Procain penicillin apparently became contaminated and deaths became due to *Cl. septique* infection. Agreed not a case to defend and claim settled at £47 19s. 0d.

Among other matters discussed were:—(1) the distinction between Third Party Insurance and the cover offered by the Society. It was agreed that all members should be urged to take out or maintain Third Party Insurance, which could be obtained from any general insurance company at low rates; (2) publicity; (3) the necessity of acquiring a reserve of at least £20,000; (4) subscription rates; (5) Christmas charities from the Benevolent Fund.

QUESTIONS IN PARLIAMENT

Slaughterhouses

Sir W. Darling (December 12th) asked the Minister of Food how many slaughterhouses formerly owned by local authorities are still under his control; and what plans he has for returning them to local authorities control.

Mr. F. Willey: Two hundred and four slaughterhouses owned by local authorities are still under our control. This control is necessary as part of the meat rationing system and I cannot forecast when it will be possible to lift it.

. . . . . .

Food Supplies: Cleanliness

Mr. De la Bere (December 13th) asked the Minister of Food whether, in view of the disclosure of the fact that there were 5,329 cases of food poisoning notified to the medical officers of health in the period January 1st to September 30th, 1950, he will now confer with the Minister of Health with a view to ensuring for the future that every safeguard is effectively exercised and with the local authorities to encourage the setting up of clean food guilds.

Mr. F. Willey: These figures emphasise the importance of a high standard of cleanliness and scrupulous care in the handling and preparation of food by traders and the public. We are very closely and actively in touch with my right hon. Friend the Minister of Health on the problem; but its solution depends as much on a wider awareness of the need for care as on official safeguards.

Clean food guilds are one of a number of useful ways for developing a more general understanding of this problem. I shall not myself regard the situation as thoroughly satisfactory until we have established much higher standards of cleanliness throughout the food trades.

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Agricultural Research Council (Reports)

Mr. C. I. Orr-Ewing (December 14th) asked the Lord President of the Council when the next Report of the Agricultural Research Council may be expected.

Mr. H. Morrison: The Council has been giving careful consideration to the form of publication most suited to its activities and has decided to issue a pamphlet describing in general terms its organisation and activities and an annual record in summary form of all active work for which it has technical responsibility. Both these publications should be available early in 1951.

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Medical Research Council (Report)

Mr. C. I. Orr-Ewing (December 14th) asked the Lord President of the Council when the next report of the Medical Research Council may be expected.

Mr. H. Morrison: A report on the work of the Medical Research Council during the years 1948-50 is in preparation and will be presented to Parliament as soon as it is ready.

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Quarantine Regulations

Mr. Langford-Holt (December 15th) asked the Minister of Agriculture what changes he proposes to make in the quarantine regulations in the light of modern scientific development.

Mr. T. Williams: I understand that the regulations to which the hon. Member refers are those relating to the importation of dogs. I am advised that the incubation period of rabies in canines and felines may be as long as six months and that there is no known way of shortening the period of incubation or of detecting the disease during its pre-clinical sage. I cannot, therefore, agree to any alteration in the quarantine regulations that apply to imported dogs.

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Colonial Service (British Civil Servants)

Mr. N. Macpherson (December 15th) asked the Secretary of State for the Colonies whether, in view of the policy of working towards self-government in the Colonies, he will make a statement regarding the security of pensions of British civilian officers in the Colonial Service.

Mr. J. Griffiths: I cannot envisage a situation in which the pensions of Colonial civil servants would not be secure. I therefore see no reason whatever for anxiety on their part.

ROYAL COLLEGE OF VETERINARY SURGEONS

MEMBERSHIP EXAMINATIONS, DECEMBER, 1950

List of Successful Candidates

(*Continued from page* 793)

Edinburgh :

FIRST EXAMINATION :

Black, M.
Cuthbertson, J. L. H.
*Forsyth, D. W.
Humphreys, M.
Kerr, J. B. C.
Muirhead, R. H.
Rodger, D. S.
Watson, A. R. A.

* denotes 2nd Class Honours.

SECOND EXAMINATION :

Gilchrist, Miss H. G. R.
Hutton, P. H.
Inness, J. F.
McLaren, A. P. B.
Maybin, James
Thomson, K. S.
Veale, J. C.
Watson, H. B.
Wilson, H. R.

THIRD EXAMINATION :

Chew, S. K.
Drake, T J.
Edgar, James
Harris, A. H.
Hutchinson, H. L.
McCullock, A. F. (A)
Merry, S. J.
Mitchell, A. W.
Stokes, P. M.
Thomson, A. P.
Watt, D. J.

(A) denotes credit in Anatomy.

FOURTH EXAMINATION :

Bruce, I. H. M.
Campbell, Kenneth
Clark, Miss S. T. (Paras)
Clemo, J. A.
Crawford, Miss H. F.
Gilling, G. H. C.
Gilling, Mrs. J. P.
Hildebrand, W. R. P. (Paras)
Hockenhull, E. W. F.
Jackson, O. F
Munro, John
Warnes, W. E. J.
Watkins, L. S.

(Paras) denotes credit in Parasitology.

FINAL EXAMINATION :

Argo, Edward
Cochran, F. R.
Condy, J. B.
Cooke, C. D.
Cragg, D. A.
Glover, T. D.
Hooper, R B.
McFadyean, C. A.
McLaren, L. E. (S)
Marr, T. G.
Minnis, J. S.
Ognowski, K.
Philip, H. McC.
Robson, T. W.
Smith, I. A.
Vicary, R. W. G.
Waterston, R. F.
Williamson, P. T.

(S) denotes credit in Surgery.

Liverpool :

THIRD EXAMINATION :

Both Subjects:

Dawkins, H. P.

One Subject:

Davies, G. P.
Davies, J. E.
Ditchburn, D. M. L.
Grainger, K. J.
Hedger, R. S.
Hyslop, N. St.G.
James, R. H.
Jones, R. A.
Keay, A. J
Lewis, E. O.
Roberts, H. G.
Roddis, A. F.
Unsworth, W. P.
Wright, G. W.

FINAL EXAMINATION (OLD SYLLABUS)

Maydew, Eric
Medcalf, Miss R. M. I.
Parry, R. T.

FINAL EXAMINATION (REVISED SYLLABUS)

Blackburn, P. W.
Briggs, Miss N. M.
Cartmell, W. B.
Jones, Ceiriog
Monk, Miss M. A.
Needham, B.
Schwarz, R. A. J.
Short, Maxwell
Smith, G. S.
Stubbs, G. B. (S)
Wannop, C. C.
Wells, C. F.
Williams, K. T.
Woolfenden, Miss E.

(S) denotes credit in Surgery.

Glasgow :

SECOND EXAMINATION :

Berger, F.
Calder, H. A.
Carrigan, T. D.
Crawford, T. G.
Cruickshank, G.
Gilmour, M. J.
Gracie, D. K.
Haresnape, I. C.
Harrison, T. C.
Jawara, S. A.
Stewart, G. H.
Towers, Miss I. G.
Tudhope, K. M.
Wallace, D. McL.
Watson, J. D.
West, R. C. A.

THIRD EXAMINATION :

Anderson, A. C.
Coats, W. A.
Cunningham, M. P.
King, J. G.
Knight, T. A.
Leach, P. A. G.
McKean, Hugh
McLauchlan, Ian
Macmillan, I. A.
Mann, Miss S. M.
Morgan, D. L.
Morris, David
Ommer, F. G.
Russell, D. A.
Skinner, D. I.
Taylor, A. McK.
Todd, D. T.
Watson, J. G.
Watson, R. C.
Watt, W. R.

FOURTH EXAMINATION :

Ahmad, S. A.
Anderson, A. W.
Angus, C. E.
Bellinge, W. H. S.
Black, A. McC.
Calder, R. H.
de Boni, Miss R. I.
Dick, I. B.
Doak, Miss N. S. P.
Fitzsimons, W. M.
Forrester, W. A.
Henderson, G. N.
McIntyre, D. I.
Moffat, Robt.
Murdoch, M. I.
Nelson, John (P)
Robertson, D.
Strang, J. R.
Tattersall, D. J.
Taylor, N. M.
Vincent, J. F.
Waddelow, I. R.

(P) denotes credit in Pathology.

FINAL EXAMINATION :

Anderson, Miss J. M.
Andrew, A. S.
Archibald, Miss H. I.
Beck, Robt.
Campbell, Miss D. J.
Clark, H. R.
Crighton, G. W.
Ferguson, M.
Ferguson, T.
Fraser, A. F.
Gallacher, P.
Geddes, Miss M. B.
Gross, Miss I. M.
Harris, G. D.
Heyworth, B.
Hugh, A. R.
McDougall, J. S.
Mckerrell, A. L. L.
Morris, W. M. S.
Nisbet, R. M.
Ostler D. C.
Patra, P. N.
Peritz, F. J.
Reid, A. N. D.
Robertson, W. W.
Shepherd, G.
Sturdy, I. C.
Swift, A. G.
*Thomson, T.
Valleley, T. F.
West, W. R. G.
Wilcox, W. H.
Wilson, Miss J. S. S.
Wright, E. D.

* denotes 2nd Class Honours.

(*To be Concluded*).

NOTES AND NEWS

Diary of Events

Jan. 4th.—Meeting of the Central Division, N.V.M.A., at the Royal Veterinary College, N.W.1, 5.30 p.m.

Jan. 5th.—Meeting of the Association of Veterinary Teachers and Research Workers, the Department of Agriculture, The University, Leeds, 10 a.m.

Jan. 10th, 11th, 12th, 1951.—Meetings of Committees and Council, R.C.V.S.

Jan. 27th.—Meeting of the British Association of Allergists, at the Royal Society of Medicine, 1, Wimpole Street, W.1, 2.30 p.m. (Discussion on Veterinary and Comparative Allergy).

Jan. 31st.—Royal (Dick) Veterinary College Annual Ball, in the Assembly Rooms, George Street, Edinburgh, 8.30 p.m.

XUM

QUARTERLY MEETINGS OF COUNCIL AND STANDING COMMITTEES N.V.M.A. DURING 1951

The following dates have been fixed for meetings next year, chiefly to give members plenty of time to reserve hotel accommodation

IN LONDON

Monday, January 22nd:

2.30 p.m. Parliamentary and Public Relations Committee.
3.30 p.m. Veterinary State Medicine Committee.

Tuesday, January 23rd:

10 a.m. Home Appointments Committee.
11.30 a.m. Organising Committee.
2.15 p.m. General Purposes and Finance Committee.

Wednesday, January 24th:

11 a.m. Council.

IN LONDON

Monday, April 16th:

2 p.m. Organising Committee.
4 p.m. Parliamentary and Public Relations Committee.

Tuesday, April 17th:

10 a.m. Veterinary State Medicine Committee.
12 noon Home Appointments Committee.
2.15 p.m. General Purposes and Finance Committee.

Wednesday, April 18th:

11 a.m. Council

IN EDINBURGH

Wednesday, July 11th:

11 a.m. Home Appointments Committee.
2 p.m Organising Committee.
4 p.m. Parliamentary and Public Relations Committee.

Thursday, July 12th:

11 a.m. Veterinary State Medicine Committee.
2 p.m. General Purposes and Finance Committee.

Friday, July 13th:

11 a.m. Council.

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Sick Horses Detained in Veterinary Hospitals

Arrangements have been made with the Government Departments concerned for a special basic ration of 2 cwt. feeding-stuffs (in the proportion of 2/3rd oats and 1/3rd bran) per month for each horse detained for operation or treatment in a veterinary hospital as from January 1st, 1951.

The ration will be based on the number of horses detained during the month preceding the date of application.

Rations for part of a month will be calculated at the rate of ¼ cwt. for each seven sick "horse days" or less.

Application forms for hospitals domiciled in England and Wales may be obtained from the Ministry of Agriculture and Fisheries, Domestic Livestock Rationing Section, Block E, Government Buildings, Lytham St. Annes, Lancs. In Scotland, application forms will not be required and written application should be made to the Department of Agriculture for Scotland, Government Buildings, Bankhead Avenue, Sighthill, Edinburgh, 11.

An application form marked "Supplementary" may be submitted to the appropriate Department to meet any abnormal influx of sick horses for which available coupons are not sufficient.

The above allowance is in addition to, and distinct from, the existing limited arrangements where special rations are required for medical treatment against a veterinary certificate.

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PERSONAL

Appointments.—The Colonial Office announces the following appointments in the Colonial Veterinary Service: Dr. J. I. Taylor, B.SC., M.R.C.V.S., Veterinary Research Officer, Uganda, to be Chief Veterinary Research Officer, Uganda; Mr. J. B. McLean, M.R.C.V.S., as Veterinary Officer, Nigeria.

Mr. J. B. Makinson, M.R.C.V.S., has resigned from the Sterility Advisory Service of the Ministry of Agriculture, and has taken an appointment with Vitamins Ltd., to work on animal nutrition and fertility at their research station, Walton Oaks Farm, Tadworth, Surrey.

University of Cambridge Doctorate.—In the issue of the *Cambridge University Reporter* dated December 13th, 1950, the name of Miss M. C. C. Lobban, M.R.C.V.S., appears in the list of successful candidates for the degree of Ph.D. The title of her thesis was: "Some Cytological Evidence for a Renal-adrenal-gonadal Interrelationship."

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Liverpool University Degrees.—Liverpool University degree examination results, announced on Thursday of last week, include the award of the degree of Master of Veterinary Science to Arthur Ramsden Jennings, B.V.SC. (LIV.), M.R.C.V.S., of the University's Department of Veterinary Patho.ogy. The degree of Bachelor of Veterinary Science has been awarded to B. Cunningham, E. L. Davies, E. Forrest, J. F. Harbourne, H. Mason, L. N. Owen (distinction in veterinary medicine), P. J. N. Pinsent (distinction in toxicology and jurisprudence), L. A. Taylor and J. Teer.

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Edinburgh University Degree of B.Sc. in Veterinary Science.—At a Graduation Ceremonial of the University of Edinburgh the following students of the Royal (Dick) Veterinary College graduated B.Sc. in Veterinary Science: Gordon Christie, M.R.C.V.S., Timothy Dawson Glover, M.R.C.V.S. and Lyndon Edison McLaren.

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Hunt Presentation to Major L. P. Pugh.—In its issue of December 1st the *Kent Messenger* records that Major L. P. Pugh, B.SC., F.R.C.V.S., of Sevenoaks, recently was presented with an inscribed cocktail set at the West Kent Hunt Ball at Park Farm, Wrotham. He has been veterinary surgeon to the hunt since 1919, and the gift marked his departure in January to his new appointment as Professor of Veterinary Clinical Studies in the newly formed School of Veterinary Medicine at Cambridge University.

Making the presentation, Major Peter V. F. Cazalet said the West Kent Hunt was losing a wise counsellor and a good friend. No words were adequate to express the regret they felt at losing him, but no doubt they had been lucky to keep him so long. On behalf of the hunt, he extended to Major Pugh congratulations on his appointment and wished him and Mrs. Pugh every happiness in their new life.

Expressing thanks, Major Pugh said the decision to leave had not been an easy one. He felt that whenever the gift was used it would always pour a "West Kent"—a potent producer of memories of the West Kent Hunt and the many friends he had. Major Pugh hoped the hunt would keep alive the love of outdoor sport, the love of the horse and affection for the lovely countryside.

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FOWL PEST IN EAST ANGLIA

In the past two months fowl pest in East Anglia has been spread through the exposure of live birds in markets by dealers and others. Although over 11,000 poultry have been slaughtered by the Ministry in that area and all the usual measures have been taken when outbreaks have occurred, the disease has not been eradicated and there is still risk that it will be spread beyond the limits of East Anglia unless further steps are taken to prevent it.

The Minister of Agriculture and Fisheries has therefore made an Order prescribing that the movement of live poultry out of an area consisting of Norfolk, Suffolk and parts of Essex, Cambridgeshire and the Isle of Ely is prohibited. Movement of live poultry through the area by rail is not prevented, but there are restrictions on the movement of birds within the area.

The sale of store poultry in the area is also prohibited but markets for the sale of poultry intended for immediate slaughter may take place if authorised by the local authority.

Copies of the Order, which is entitled The Live Poultry (East Anglia) (Restrictions) Order, 1950, can be obtained from the Ministry of Agriculture and Fisheries, Hook Rise, Tolworth, Surbiton, Surrey, or from H.M. Stationery Office.

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Despite the Grants Committee's view that the University's proposals for a veterinary school should be deferred for at least five years, the University proposes to continue investigating the most effective means of providing facilities for veterinary training for Welsh-speaking students at the earliest possible date.—*South Wales Echo.*

LEGAL NOTES

Posed as a Veterinary Surgeon.—On November 20th the *Portsmouth Evening News* reported the hearing by the Portsmouth magistrates of a case in which a kennelman, who posed as a veterinary surgeon, and by means of false pretences obtained money from City traders, was sent to prison for six months.

Joseph Henry Wainwright (33), married, of Salisbury Road, Southsea, stated by the police to have several previous convictions, including one for false pretences, was also fined £20, or 28 days' imprisonment, for setting himself out to be a practising veterinary surgeon, not being on the Veterinary Register.

The police were assisted in this prosecution by the Registrar, Royal College of Veterinary Surgeons, who supplied a certificate saying that the accused was not registered on either the Register of Veterinary Surgeons, or on the Supplementary Veterinary Register.

Wainwright pleaded guilty to this offence; to three charges of obtaining credit by false pretences from Portsmouth traders; and to one charge of obtaining cigarettes by means of a trick.

His sentence included terms of six months on each indictable offence, and one month in respect of the fine, to run concurrently.

Prosecuting, Mr. Roy Neave said that in October, Wainwright went to the "Albany" public-house, Commercial Road, Landport, and saw the manager, telling him he was a practising veterinary surgeon. He was given a six-month-old kitten by the manager for veterinary treatment. He later returned the kitten as having been treated, together with a certificate and a bill for £1 17s. 6d. On all his billheads, alleged Mr. Neave, Wainwright was described as a veterinary surgeon and a Fellow of the Zoological Society. He was paid by the manager.

Wainwright then telephoned an inspector of the R.S.P.C.A. in Portsmouth, and said he was a vet. working in Southsea and had come from Leeds University where he had become a vet. and a Fellow of the Zoological Society. He said he wanted to assist the Inspector in any cases of cruelty to animals.

Later, Wainwright went again to the "Albany" and asked for a packet of cigarettes valued at 1s. 9d. When asked for the money he informed the attendant that he had seen the manager and "it was all right."

The manager had given no such authority, said Mr. Neave, and the police were informed. Wainwright visited three traders "and in all cases obtained credit by saying he was a veterinary surgeon," added Mr. Neave.

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THE REVIVAL OF RIDING

Some at least of our veterinary schools, we are glad to say, have their riding clubs and it is to be hoped that the authorities at all of them have constantly in mind what we in our profession must always regard, not only in respect of tradition but of practice, as the essential provision of facilities for this pursuit. A salutary reminder of the persisting value of horsemanship in a good veterinary training was given by a correspondent to our issue of September 17th, 1949, and it is indisputable that his case is strengthened by the ever-increasing interest in equestrian affairs demonstrated by the general community, in particular, by its younger members.

Striking evidence of this is afforded by the devotion of its main article by our leading national daily, in its issue of November 11th, to the following feature by its Special Correspondent. So comprehensive is his review of the situation that we feel justified in reproducing it in full, with acknowledgment to *The Times*. The contribution is headed: "The Revival of Riding: English Horses and Horsemen Since the War" and the text is as follows:

In the years between the wars there was a remarkable revival in all matters equestrian, possibly as a natural reaction to the mechanical age in which we live and as a means of temporary escape from conditions that were becoming increasingly crowded and from a life the tempo of which had increased to the point of discomfort. This affected all classes of society, not least the office worker in big cities. If the almost universal motor-car has given a taste for rural surroundings to townsmen, this revival of the use of the horse as a vehicle of pleasure has enabled thousands to learn, and so to love, our incomparable countryside and to understand something of the life of the countryman. To-day—almost from the moment when the guns ceased fire—there has been another revival, remarkable because the cost of everything has soared to fantastic heights and to enjoy one pleasure entails heavy sacrifice in other ways.

An obvious instance is the surprising recovery of both foxhunting and polo. This season just begun there are more packs of hounds hunting than there were in 1939 and, what is more remarkable, there are more people hunting, especially in the "Provinces," and most of them have to "do" their own horses. Of the 200-odd packs now active a full quarter are actually farmers' packs, and of the remainder the committees consist almost entirely of farmers, who appreciated not only the exhilarating recreation given by hunting to all classes of a community that is hard worked and lacks the entertainment available to the townsman, but also the practical use and profit of foxhunting as an institution. As a result of enthusiastic co-operation much of the wire is being got out, to make at least parts of the country rideable, and the help given by personal effort and in kind proves the esteem in which the local hunt is held by the entire countryside.

Polo, though in one sense essentially a rich man's game, is steadily recovering and last season the standard of play was beginning to approach that of the years before the war. What is more significant is that this game of games, unequalled as a spectacle, has attracted holiday makers in their thousands to enjoy the sport on the country grounds. At Cowdray Park, at Henley, and at Sutton Place attendances of 5,000 spectators were common and at Orford, in Suffolk, these numbers were doubled.

Horsemanship

All Englishmen have the love of the horse deeply implanted in them. It is not only the prospect of gain that brings those vast crowds to Aintree and to Epsom. The understanding of the horse and of his care is increasing, and so, too, is the general standard of horsemanship. For this we are indebted most of all to the activities of the pony clubs, most of which are organised by the local hunts though many are active in the built-up areas, and which number a membership of over 20,000 children. Though the members are taught to ride well according to the most tested methods (as an earlier generation was not) the most valuable lesson is in efficient horsemastership, which ensures the utmost well-being of their ponies, who are also their pets.

For those unable or unwilling to hunt there is the show ring, which is, in fact, the shop-window of the breeder and gives, besides, the greatest interest and variety to hundreds of thousands of spectators every summer. The contribution to the dollar drive made by breeders of horses is not generally understood. Last year the exports of horses of all kinds were worth over £3,500,000 and the total was by no means dominated by bloodstock. The export to America and the Dominions of Arab horses of the purest breeding, the root-stock of the English thoroughbred, is a considerable item. So, too, are sales of our nine separate breeds of native ponies, of which at present the spectacular Welsh and the tiny Shetland enjoy the greatest demand. Moreover, the Hackney horse and pony, among the most typical of our breeds, compact of beauty, fire, and strength, are constantly reinforcing imported stock in the United States.

If it were not for the keen competition of the show ring and the steady improvement in type thus stimulated, the demand for English horses would dwindle. Each year since the war the quality in all classes has steadily improved and to obtain a championship rosette, even at a small country show, something rather better than good is needed.

There are also our four magnificent breeds of heavy horses. It is true that mechanical vehicles have displaced them on the farms and in the cities as the principal means of transport, but there is still much work that can be done more efficiently and cheaper by the horse than by the machine. Though their numbers are diminishing and though there is still a repellent traffic in these lovely creatures for slaughter, these, too, have their export value—Shires, Punches, Clydesdales, and the now anglicised Percheron.

Since the war the sport of show-jumping has become increasingly popular and is now a tremendous "draw" to the public. Thanks to the foresight and energy of the British Show Jumping Association the general standard of performance has improved out of all knowledge. In international competition British teams have become more often successful. In all sports and pastimes there is a need for the accomplished expert, as an example and as an encouragement, and, here again, recent successes have brought many enquiries for our horses from abroad. An offer of £10,000 for one outstanding animal was recently refused.

International Contests

During the past season, which began at Nice last April, our representatives have won five "Nations Cups" out of the seven for which they competed. Since then they have contested with some success in the United States against even the Mexicans, winners at the last Olympic Games, whose ruthless methods of schooling do not appeal to Englishmen, but who have remained invincible in the Americas since 1948. In that year, for the first time, a British team obtained an Olympic medal, finishing third to Mexico and Spain, whose riders made a welcome return to International Society

and, with Mexico, France, and ourselves stand in the forefront of a world which they themselves taught to ride. The centuries-old Spanish school, at which the ancient art of High School equitation is practised and taught, has survived even this war and, even in uneasy Vienna, continues to practise its mysteries, to the edification of the horsemen of all nations. Preparation for the next series of Olympic Games at Helsinki is going forward steadily and, in spite of the absence of any official financial support, Great Britain is regarded, after Mexico, as the most likely winner of the *Prix des Nations* for jumping.

A new event has enriched the sporting calendar. This is the annual Three Days Test at Badminton inaugurated by the Duke of Beaufort in the heart of sporting England. Its chief object is to discover suitable talent to represent us two years hence in the Olympic three days test, the most exhaustive and searching examination of horse and rider yet devised and even more worth winning than the Grand National itself. Apart from its importance with regard to the Olympic Games, this is a test perfectly suited to the English thoroughbred horse and horseman and one which will presumably remain a regular fixture each year.

This Olympic test, too, we should have a good chance of winning in 1952, provided our men and horses are given adequate preparation and provided owners of suitable animals are prepared to forgo their own pleasure by lending them. All this costs money, and the King and Princess Elizabeth have already given a splendid lead by subscribing substantially to the International Equestrian Fund opened by the British Horse Society, an example which is being followed enthusiastically.

"Dressage"

Much more interest is being taken in the art of *dressage*, so called to differentiate it from the training of the racehorse, but which is, in fact, no more than the normal training of the horse and rider to perform the natural airs and movements of the animal in perfect harmony. This is an essential item in the preparation of a show jumper or "Three Days" horse, and equally essential in the training of any saddle horse, hunter, hack, polo pony, or child's pony to be an efficient and safe ride.

In spite of the almost complete mechanisation of the Army it is interesting to note that the military authorities continue to encourage horsemanship. Nothing else can so develop the qualities of decision, boldness, and what is known as an "eye for a country." The standard recently shown, from experienced cavalrymen of pre-war days to the gentlemen-cadets of the Royal Military Academy, at the recent Army Hunter Trial championship was a really high one.

For those unable to keep their own horses very many riding schools have come into being during the last 20 years. Most of them give expert tuition and keep their hirelings in admirable condition, for all the scarcity and cost of forage. There is no better way to enjoy the countryside and its wild life than by riding about it, and the horse is a jovous companion.

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Blending the Best Thoroughbred Stock

M. Boussac's Directive for Success in Racing

The success of French racehorses was referred to last night by M. M. Boussac, the world's leading racehorse owner and breeder, who headed the winning list of owners and breeders in Great Britain this year (reports *The Times* in its issue of December 13th). Winner of the Gimcrack Stakes with Cortil, he was the guest of honour at the annual dinner of the "Anciente Fraternity of York Gimcracks" in York. As M. Boussac does not speak English, a translation was read by Lord Zetland.

"A certain uneasiness is shown in England about the success of French horses" he said. "The belief that the French victories were a result of better feeding during the war is a legend. French breeding suffered a heavy blow through the German invasion of 1940, which disorganised the chief stud farms. It bore the brunt of German requisitions, hitting a large number of brood mares and stallions, considered, at the time, as the *élite* among French thoroughbreds. Many stud farms were destroyed or damaged during the battle of Normandy, and the complete absence of transport during those six months gravely prejudiced the breeding of yearlings and foals of that generation. French breeding went through a much harder period than that in England from 1940 to 1943.

"Nor do different training methods constitute a reasonable explanation. Typical cases such as those of My Babu and Colonist II, and the total earnings of imported French horses show that English trainers have nothing to learn from French trainers. The present vitality of French breeding is not the result of an accident but of an evolution which was begun, or rather resumed, after World War I.

"English breeding is always carried on with the same blood. I myself have sent every year a number of brood mares to be covered by English stallions. During the last pre-war years I had great difficulty in finding the new bloods that I desired. If you refer to the statistics you will see that two of the best stallions standing in England were imported just before the war.

"In support of this thesis of the advantage of blending the best stock, I recall a conversation with a very cultured friend who had widely travelled. He told me that one of the most fascinating sights that he had ever seen was a 'white ball' which took place at San Francisco. Never had he seen an assembly of young girls so lovely and graceful, and when I asked him what he thought was the reason for this, he said that, in his opinion, it was because San Francisco is a 'racial crossroad.' Everywhere else you see a type very often too strongly marked. There, on the contrary, racial blending re-established harmony and balance.

"When I first took up breeding I looked for precepts from the past. I noticed that nearly always the evolution of the great breeding centres was identical. When arrived at their highest point they continued to work with the same bloods, and the decline followed. I then remembered San Francisco and the racial blending, and I sought the best English, American, and French bloods it was possible to find.

"In 1918 I took over the breeding stock of Mr. H. B. Duryea, who had set up a stud farm in France in 1908, and had had considerable success. In England I sought out the best blood lines, applying naturally, very often to Lord Derby, probably the greatest English breeder. In France I looked for blood called 'O'd French blood.' This I found at Mr. de Saint-Alary's, whose rule had always been to keep this blood intact and who obtained the greatest success with this breed.

"These blendings, to which have been added naturally the new bloods which had proved their worth, after 30 years of selection, resulted in the bloodstock I am now breeding.

"Breeding is not carried out in an office. Breeding is not just taking the pedigree of stallions and brood mares, then placing them side by side for breedings and outcrossings following specified rules. This would be too simple and easy.

"I think that matings ought primarily to be inspired by the physical qualities of the individuals treated, and also by the result already obtained. Having all these elements, you can then work on the origins, in amalgamating all these conditions with the scientific crossings, drawing therefrom conclusions which perhaps will give you the result you wish.

"This demands a great deal of work and a knowledge, '*une psychologie*,' of all the elements which go to make up your stock, and as stock is an essentially shifting subject, a constant change in the methods, or at least in their application. I may tell you that what I do at present is totally different from what I did ten years ago and I am convinced that what I shall do in five years hence will be different from what I do now.

"If I could give an answer to the question, 'what is your secret?' I should answer for the stock as for all else: work. And I shall add that experience has shown that work which gives the most outstanding results is that which is done with passion.

"Breeders all over the world are, generally, passionate for this trade, but English breeders more so than any others. This is why I am convinced that English breeding will gain ground, and take the place it deserves throughout the world, thanks to its glorious past."

* * * * *

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Swine Fever:

Cheshire.—Pinewood Nurseries, Lower Peover, Allostock, Knutsford (Dec. 11th).

Cumberland.—Wetherigg Farm, Penrith (Dec. 11th); Crewgarth, Ousby, Penrith (Dec. 14th).

Derbyshire.—62, West End, Pinxton, Nottingham. (Piggeries at Wallstones Farm, Hazelwood, Duffield, Derby). (Dec. 13th); Brown Close Farm, Heath, Nr. Chesterfield (Dec. 15th).

Lancs.—Grange Farm, Marshall's Cross Road, St. Helens, Lancs. (Dec. 14th).

Lincs (*Lindsey*).—West Hale Farm, Sandtoft, Epworth (Dec. 11th); Conesby Farm, Normanby Road, and East Butterwick, Scunthorpe, Lincs; Pye House Farm, Cadney, Brigg, Lincs (Dec. 13th); Vale Farm, Barrow-on-Humber, Lincs (Dec. 14th).

Stirling.—3 Holding, Langbank, Milngavie, Glasgow (I.P. Langshot Farm, Torrance) (Dec. 14th); Canal View, South Barrwood, Kilsyth, Glasgow (Dec. 14th).

Yorks (*N.R.*).—10, Lime Avenue, Stockton Lane, York (Disease at Whitby Avenue Allotments, Heworth, York) (Dec. 11th).

Yorks (*W.R.*).—South Farm, Harthill, Sheffield (Dec. 11th); Bank House Farm, Silkstone, Barnsley (Dec. 13th); Manor Farm, High Ackworth, Pontefract, Yorks (Dec. 14th).

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VALUE OF PASTEURISATION

In the feature corresponding to our own, the following appeared in the issue of *The British Medical Journal* of December 9th:

Q.—*What is the effect of pasteurisation on the food value and digestibility of milk? Is there any evidence that pasteurisation reduces the incidence of tuberculosis, and has it ever been shown to cause an increase of other diseases* (e.g., *in institutional observations*)?

A.—Pasteurisation of cows' milk by the official Holder method laid down by the Ministry of Health leads to the destruction of about 10 per cent. of vitamin B and 20 per cent. of vitamin C. Carefully controlled observations on rats, mice, calves, and children have failed to reveal any change in the biological value and digestibility of the protein, in the availability of the calcium and phosphorus, in the amount of vitamin A or D, or in the total energy or nutritive value of the milk for the growing animal. The slight destructive effect on vitamins B and C is of little practical significance, because vitamin B is about ten times as abundant in cows' milk as in human milk, and because vitamin C is present in such small quantity in cows' milk and is so readily inactivated by exposure to light that in infant feeding it must be supplemented by orange juice or some other abundant source of vitamin C. Pasteurisation by the high-temperature short-time method, which is also officially recognised by the Ministry of Health, has not been studied so fully, but there is reason to believe that the minor changes it produces in milk are even less than those caused by the Holder method.

The best factual evidence that the use of pasteurised milk reduces the incidence of tuberculosis is afforded by the observations of R. M. Price (*Canad. J. publ. Hlth*, 1934, **25**, 13) at Toronto. Working at the Hospital for Sick Children, she determined the type of infecting bacillus in a series of 300 cases of non-pulmonary tuberculosis in children under 14 years of age. Of these, 15 per cent. were found to be infected with the bovine tubercle bacillus. Enquiry revealed that every one of these children came from parts of Ontario where the milk was drunk raw. In Toronto itself, where compulsory pasteurisation had been in force since 1915, not a single case of infection with the bovine type was discovered in spite of the fact that 4 per cent. of the churn milk and 26 per cent. of the bulked milk entering the city contained tubercle bacilli.

There is no evidence that the use of pasteurised milk causes an increase in the incidence of other diseases. On the other hand there is a good deal of evidence to show that its use is followed by a reduction in the incidence of tuberculosis of bovine origin, of undulant fever, and of epidemic milk-borne disease such as scarlet fever, septic sore throat, diphtheria, enteric fever, dysentery, and gastro-enteritis. A classic illustration of the effect of pasteurisation in reducing disease is afforded by the experience of a children's institute on Randall's Island, New York, where a mortality rate of 44·36 per 1,000 per annum was promptly reduced to one of 19·8 after all the milk was pasteurised, no other hygienic measures having been put into operation.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

FRACTURED LEGS IN HORSES

Sir,—The shooting of the Queen's horse "Monaveen," like many similar incidents which have occurred somewhere or other almost every day, has again aroused grave doubts in my mind as to the justification (in some cases) for such destructions. It is a simple solution to the problem to reach for a gun, and I have wondered whether most of those who do it, ever pause to consider the possibility of repair.

It seems probable that quite a worth-while proportion of the fracture cases could and should be treated and saved by the modern methods available, if only the rank and file of our colleagues would determine to take action only after X-ray examination. For instance, I know of a recent case in which a radiograph revealed only a hair-line fracture of the suffraginis, without any displacement; and yet the animal was shot.

It is not for a moment suggested that every case should be submitted to treatment, as of course each one would have to be considered on its merits, *e.g.*, age of the animal, intrinsic and sentimental value, and the nature and position of the injury as revealed by X-rays. The fact that the horse is insured, should not really be allowed to influence the decision.

It may be assumed by some that a horse with a repaired fracture would not be able to resume its normal work; but even if this were true, many of them could surely be used for breeding.

Fortunately, it is in fact not true, for most readers will remember the widely publicised case of the race horse "Overland" which twice broke a leg and was successfully treated. Other cases have been reported to me from time to time (details of which I could ascertain if necessary), and I understand that several American veterinarians have achieved success in this field.

It may be remembered that I published an account in this journal (May 7th, 1949) of the repair of a fractured os suffraginis in a hunter by the older method of an iron splint and a massive plaster cast. The last I heard from the owner was that the horse had done very well.

Then, last autumn, Mr. Clement Fennel and I plated the os calcis of a young bull, which was so strong and well-united after ten to 12 weeks that the animal was put to use. Other instances could be cited, sufficient to show that concerted efforts should be made in this advanced era of our knowledge to save life, and avoid in some cases great financial or sentimental loss.

I feel that plating, after open reduction, is likely to be the most successful method, although the application of screws through both cortices of the bone would no doubt prove a valuable and non-complicated method. In all cases I would (personally) reinforce with a plaster cast. It is recognised that many critics of this letter (and of course there will be some) will say it is inhumane to keep such an animal alive. It is more than likely they would not hold such a view if they felt sure of ultimate recovery. Why the distinction? Many a horse sustains a severe kick, or an extensive lacerated wound involving tendons or a joint, or a punctured foot, all of which would be at least as painful as a cracked bone, but from which the animal would recover. And, indeed, in the absence of radiography, fracture may exist, though remain undiagnosed, and the animal still recovers.

Other critics will say a horse cannot stand for long on three legs; but when afflicted in the manner just indicated, it must be conceded that in fact they do so, especially if aided by slings.

Nothing much is lost in making an attempt in these cases, but much indeed could be gained from every viewpoint. I realise fully the difficulties, the need for special facilities, expenditure of time, and costly equipment, etc., but I still contend that those who can overcome such obstacles will be amply repaid, if their enthusiasm can be aroused, as mine has been.

I have equipped myself, as well as I could, to be ready for the first opportunity that offers, to help any veterinary surgeon who may feel he has a suitable case for operation. I am glad to offer my services entirely free, in order to have the opportunity to prove the justification for the adoption of new orthopaedic surgery in the service of man's friend—the horse.

Yours faithfully,

H. Kirk.

"Crovland,"
658, Finchley Road,
Golders Green,
N.W.11.

December 9th, 1950.

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HERD CONTROL OF MASTITIS

Sir,—During the last 12 months we, in conjunction with the V.I.O. of this province, have carried out a scheme for mastitis control in 17 herds in this practice. The herds selected for this treatment were either suggested by ourselves as having a very high incidence of mastitis, or from the local survey of the incidence of mastitis in the various parishes being carried out by the V.I.O.

Before the herd is selected it must have an incidence of over 20 per cent.; in other words, the only satisfactory method would be to treat the whole herd. The cost of wholesale treatment is beyond the pocket of the average farmer. The herd must be self-contained so that records of after treatment tests can be completed. The owner must have sufficient intelligence to carry out the control measures suggested, and the after-treatment sampling. Decision as to whether a herd is suitable for this "blitz" treatment rests with ourselves; the owner is not aware that his herd is under consideration.

The mastitis test, which is taken at the same time as the treatment with penicillin, is conducted by us, and suitable fees for the visits, time, and advice are charged to the farmer who is quite aware that the penicillin is provided free by the Ministry, and on the express condition that control measures suggested by us and the V.I.O. are closely adhered to and that he will give every assistance for later tests to make sure that all infection has been eradicated.

The first check test, which is carried out (ten to 14 days) after treatment, is performed by the V.I.O. himself; he is then able to form an opinion as to whether the control measures in operation are satisfactory.

If there are any animals which have not responded to treatment these are treated at the farmer's own expense, and then a further herd test is carried out at about ten to 14 days after treatment. Subsequent tests are carried out at six weeks, six months, and 12 months to make sure there is no breakdown after treatment. Any fresh purchases or any suspicious cases of mastitis are isolated and tested by us.

The results from the "blitz" treatment have been beyond expectations even where the incidence of *Str. agalactiae* has been well over 50 per cent. infection; we have always had the wholehearted support from the owner when he realises the tremendous financial benefit in milk yields he will receive as a result of complete eradication of *Str. agalactiae* mastitis.

We are quite sure the profession will gain the respect of the farming community as a result of the judicial application of a scheme for eradication of *Str. agalactiae* carried out by ourselves and the V.I.O. of our province.

We are always most grateful for the way in which the V.I.O. comes to our help in all matters of disease diagnosis, control and eradication and feel that he is the most suitable person through whom any financial grants from the Ministry should be dealt out.

It is our opinion that the application of this scheme in a satisfactory form will hasten the eradication of one of the worst scourges of the dairy farmer, the aim for the attainment of which the profession must strive.

Yours faithfully,

THOMAS F. WILLIAMSON.
P. ROBINSON.

Ercall Heath,
Newport,
Shropshire.

December 13th, 1950.

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THE LATE EMERITUS PROFESSOR JOHN SHARE JONES*

Sir,—It was with great regret that some few days ago I received a cable informing me of the sudden passing on of my life-long friend, Emeritus Professor John Share Jones, and I cannot but submit a small personal tribute of my admiration and affection.

This is not the place for an extended biography, for his contributions to the advancement of veterinary science were too manifold to be considered in a short letter. An extremely interesting publication of a biographical nature has, however, been edited by Mr. Harold T. Graham, M.A., Secretary for Publications, the University of Liverpool.

Professor Share Jones fought throughout his professional life for the recognition of veterinary science by the universities. For many years he was alone in this fight. This was an example of one of his most enviable traits—that he was prepared to face alone the most powerful opposition to his views if he was convinced that the cause he advocated was for the benefit of his profession and for the benefit of the country in general.

At Berne in 1934 he was the only British representative to receive an honorary degree. The Doctorate was conferred upon him for his work "in expanding the conception of his science and increasing the possibility of its service to the community, thereby advancing the cause of university education."

On his retirement the Senate of the University of Liverpool passed the following resolution: "That the Senate desires to express to Professor Share Jones on his retirement its appreciation of his services to the School of Veterinary Science and to the University during a period of 35 years. His powers of advocacy, his steadfastness of purpose and his devotion to the advancement of his science and his profession, have led to the firm establishment of the University as a leading centre for the teaching of veterinary science in Great Britain. His success has been due no less to his kindliness of heart than to his energy of mind, and Senate begs him and his wife, Dr. Mary Share Jones, a graduate of the University, to accept its best wishes for many years of health and happiness."

His ability to see a little further ahead than most men will be missed in professional and political councils, and his stimulating friendship will be sadly missed by his friends.

Yours faithfully,

FRANK H. MANLEY, *Professor*,
Department of Bacteriology.

School of Veterinary Medicine,
Alabama Polytechnic,
Auburn, Alabama.

December 9th, 1950.

* A memoir will appear in our next issue.—*Editor.*

SYMPOSIUM OF SHEEP DISEASES

Sir,—Owing to an unfortunate series of events I did not receive until December 12th the proofs of the shorthand-reporter's copy of my reply to the discussion in the Symposium of Sheep Diseases presented at the Annual Congress. Consequently these exceedingly rough notes have appeared in print. So that the misquotations may be corrected, I take this opportunity of making clear the main points.

Activation of Latent Spores.—It is well known that the incidence of blackquarter in cattle increases in very wet seasons, and there exists the speculation that sudden debilitating conditions resulting from the influence of the weather will activate latent spores. Most of us are aware of the difficulty of comparing the behaviour of related organisms in the animal body. For the last six months I have attempted to ascertain the fate of viable spores of *Cl. welchii* when fed to guinea-pigs and rabbits. There is as yet no evidence to suggest that they localise in the liver, spleen and bone-marrow as do the spores of *Cl. oedematiens*.

Black Disease in Cattle.—In reply to Mr. Allen's query, I have seen no clinical cases of black disease in cattle, but the probability that the disease occurs is suggested by the fact that in black disease areas the incidence of latent spores of *Cl. oedematiens* in normal, healthy, bovine livers is high. Although it is theoretically possible that anaerobes other than *Cl. oedematiens* may be activated, I have encountered only type B strains of *Cl. oedematiens*.

In reply to the question on the subject of pulpy kidney disease and helminthiasis, it is not my experience that there is any association. I have observed, however, that pulpy kidney disease has on occasion occurred in young fat lambs following dosing with phenothiazine.

I should be pleased to clarify any other of my reported answers.

Yours faithfully,

S. JAMIESON.

Department of Bacteriology,
Foresterhill,
Aberdeen.

December 16th, 1950.

[We must append our sincere apologies to Dr. Jamieson and our readers, adding to his explanation the cardinal point that the original notes failed to reach him.—*Editor.*]

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange*	Sheep Scab	Swine Fever
Nov 1st to 15th, 1950	9	—	4	—	—	35
Corresponding period in—						
1949	11	—	31	—	—	—
1948	5	2	1	—	2	1
1947	7	—	397	—	—	2
Jan. 1st to Nov. 15th, 1950	306	20	111	—	23	277
Corresponding period in—						
1949	206	13	541	—	34	5
1948	98	4	253	1	54	26
1947	104	103	1797	1	74	33

NOTE.—The figures for the current year are approximate only.

* Excluding outbreaks in Army Horses.